"Coal for Victory"

COAL AGE

NOVEMBER 1943

McGRAW-HILL PUBLISHING COMPANY, INC.

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DETROIT

"CRISIS IN COAL"

Voltages Doubled in Two Steps • More Ton-Miles in Haulage • Supervisory Training Benefits • Mining Coal From Ohio River • New Blue Creek Mine • New Shovel Controls

OVERCOMING A *Water Hazard!*

SUN MINE LUBRICANTS

Reduce Loader Cleanings 83% . . . Save Labor, Grease and Tonnage

When mining machinery operates under conditions of extreme moisture, lubrication troubles multiply. Extra care must be exercised in the selection of the lubricant that will stand up best under such conditions.

In one case, a loading machine operated in the presence of water. The grease in the transmission and gathering heads gummed badly, necessitating a thorough cleaning and regreasing *every two or three days!* This cost an average of $32.00 each week for *labor alone* . . . plus a high consumption of grease and a serious loss of tonnage.

A Sun Engineer discovered that sulphur in the water reacted upon the competitive grease being used, causing separation and excessive gumming. He recommended the proper Sun Mine Grease to meet the conditions. In four months' use, cleaning has been reduced 83% . . . saving the high labor cost, cutting the consumption of grease to 1/6 of the amount previously used and keeping the loader in almost continuous production.

This is another typical example of how Sun Engineers and Sun Lubricants are helping mine operators maintain peak production, save vital equipment and reduce costs. Perhaps a Sun "Doctor of Industry" can be of service to you. Just write . . .

SUN OIL COMPANY, *Philadelphia*

Sun Oil Company, Limited, Toronto, Canada

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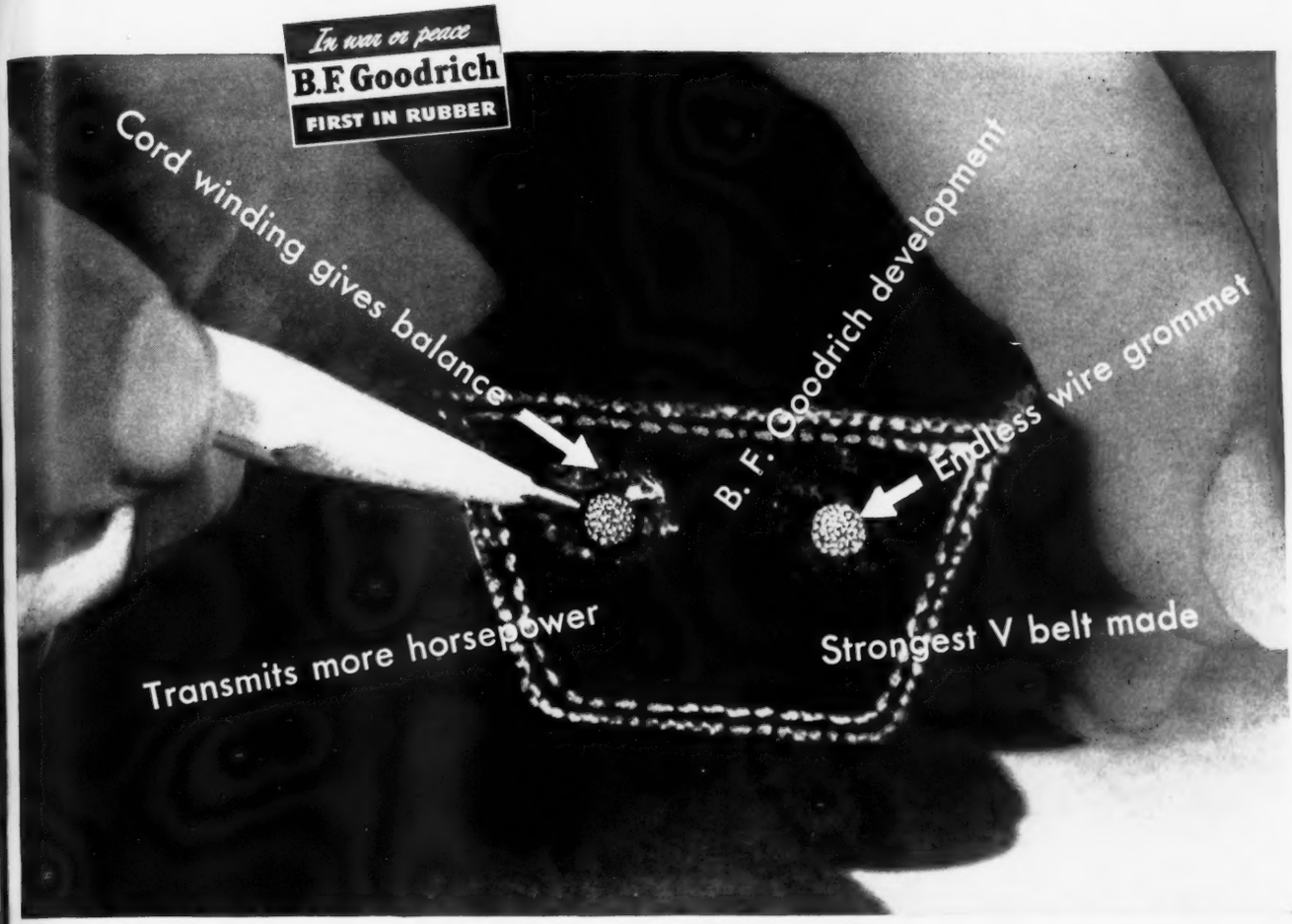
SUN INDUSTRIAL PRODUCTS

HELPING INDUSTRY HELP AMERICA



No other V belt like this

The first and only grommet-type wire reinforcement—a B. F. Goodrich development

THIS new belt, reinforced with endless wire grommets, transmits more horsepower for a given size of belt. It will solve problems created by difficult old applications and will be useful in many new ones.

Ordinary wire V belts are made by winding a continuous wire around a drum, then cutting into narrow sections to form the individual belts. Thus in ordinary belts there is a point on each side where the wire is close to the edge. The B. F. Goodrich grommet is made by forming wire cable into a loop, then winding it spirally on itself up to the needed size. It's endless; in the belt it is always the same distance from the edge (wires will never be exposed by slight wear); it has less stretch than small individual cables, more strength for a given amount of wire. Thus it transmits more horsepower for a belt of given size.

The wire grommet, spirally wound in one direction, is covered by cord spirally wound in the other direction. Thus each grommet is balanced — and each belt is balanced.

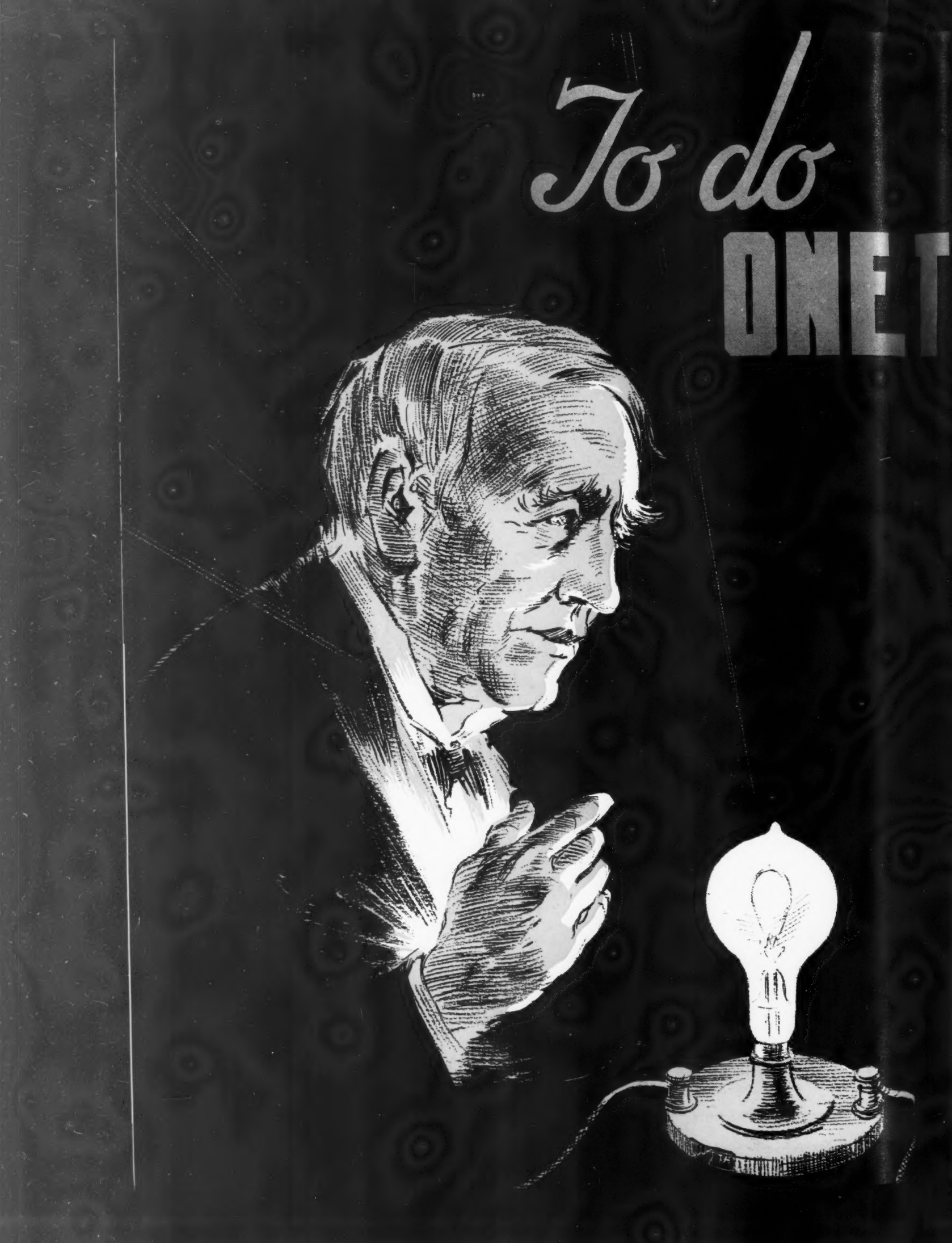
Strongest V belt ever made

This new principle makes the strongest V belt ever produced in proportion to size and weight. The well-known V belt advantages of efficient power transmission, low maintenance, long trouble-free life, quiet and clean drives, less weight are now available for many drives which have always had to put up with heavier, costlier methods.

If you have drives on which other belts have failed — or drives on which lack of strength has made former V belts impractical — write B. F. Goodrich. Our belt specialists will help you engineer this revolutionary new belt to your drives to give you greater power efficiency, and save you money, trouble and production time. *The B. F. Goodrich Co., Industrial Products Division, Akron, Ohio.*

B.F. Goodrich

RUBBER *and* SYNTHETIC *products*


To do
ONE

ETHING

and do it supreme

Even if Thomas Alva Edison had done nothing else but invent the incandescent electric light, that single fundamental achievement, the result of genius, patient research and unremitting toil, would have set him apart as one of the greatest benefactors of human progress . . . For 25 years Hulburt has steadily pursued but one fundamental aim—to produce Grease of but one Quality, the highest attainable, for but one specialized purpose—to lubricate coal mine equipment.

HULBURT OIL & GREASE COMPANY

Specialists in Coal Mine Lubrication

PHILADELPHIA, PENNSYLVANIA

HULBURT *Quality* GREASE

FOR GATHERING OR FOR MAIN LINE HAULAGE, YOU'LL GET OUT GREATER TONNAGE WITH

HEAVY-DUTY PHILCO BATTERIES

Powered with heavy duty Philco Batteries, your mine locomotives will handle more tons per shift . . . and do it consistently! In hundreds of mines Philco Batteries are keeping production at peak figures because every Philco is engineered to deliver *sustained* high voltage . . . designed to give you the power to pick up a long trip of loaded cars, haul it away and have the empties back in record time!

You get this extra wallop from a Philco for two reasons. First, because the design of the Philco grid provides high electrical efficiency and superior conductivity. Second, because the Philco "K" Process of dehydration produces an exceptionally porous plate with a tighter bond between active material and grid.

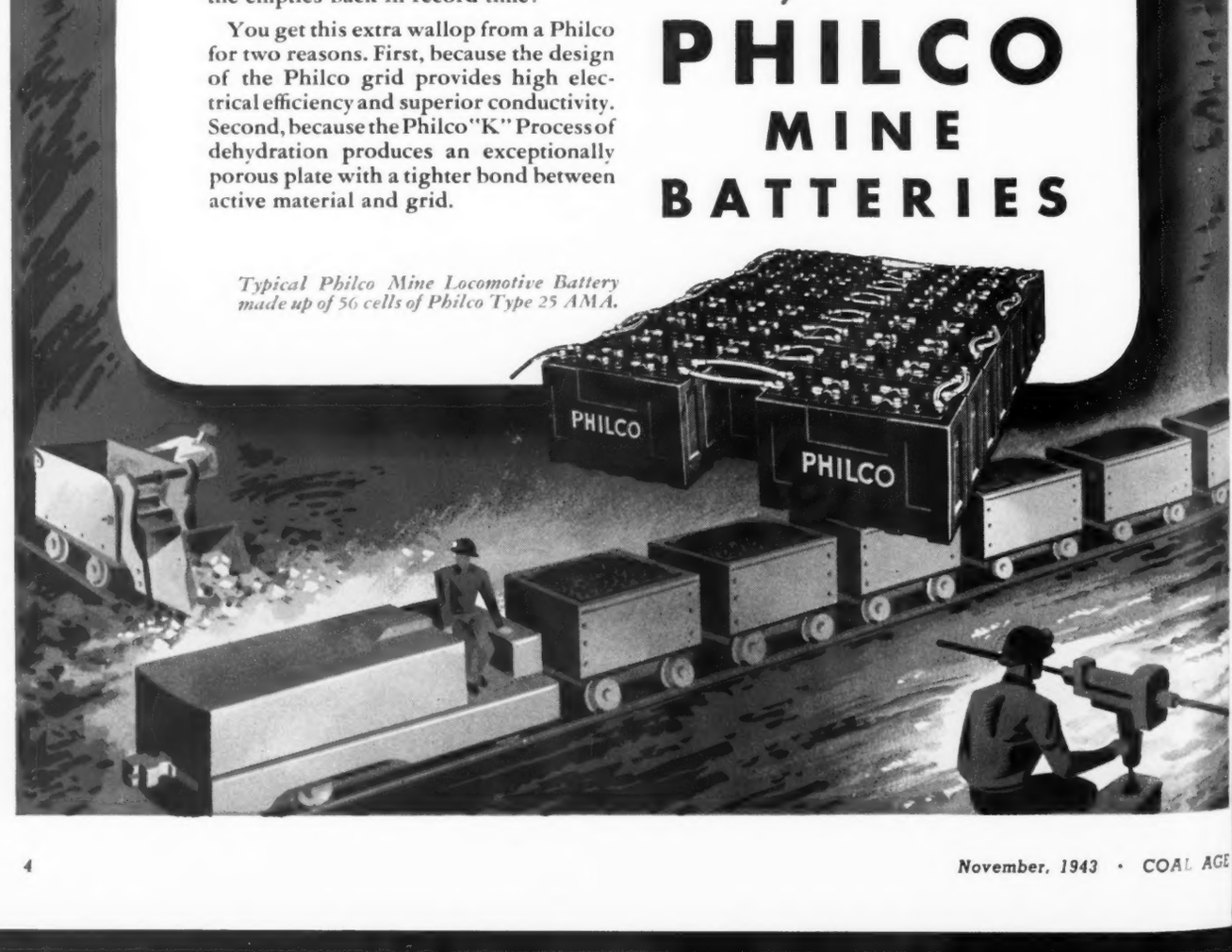
Only in a Philco do you get these two important battery features!

For complete information and engineering specifications, write for the Philco Mine Battery catalog. *Philco Corporation, Storage Battery Division, Trenton 7, New Jersey.*

Replace with

PHILCO MINE BATTERIES

Typical Philco Mine Locomotive Battery made up of 56 cells of Philco Type 25 AMA.



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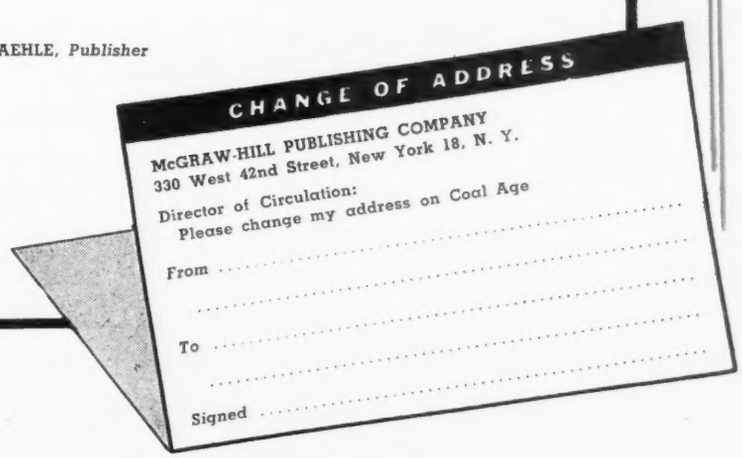


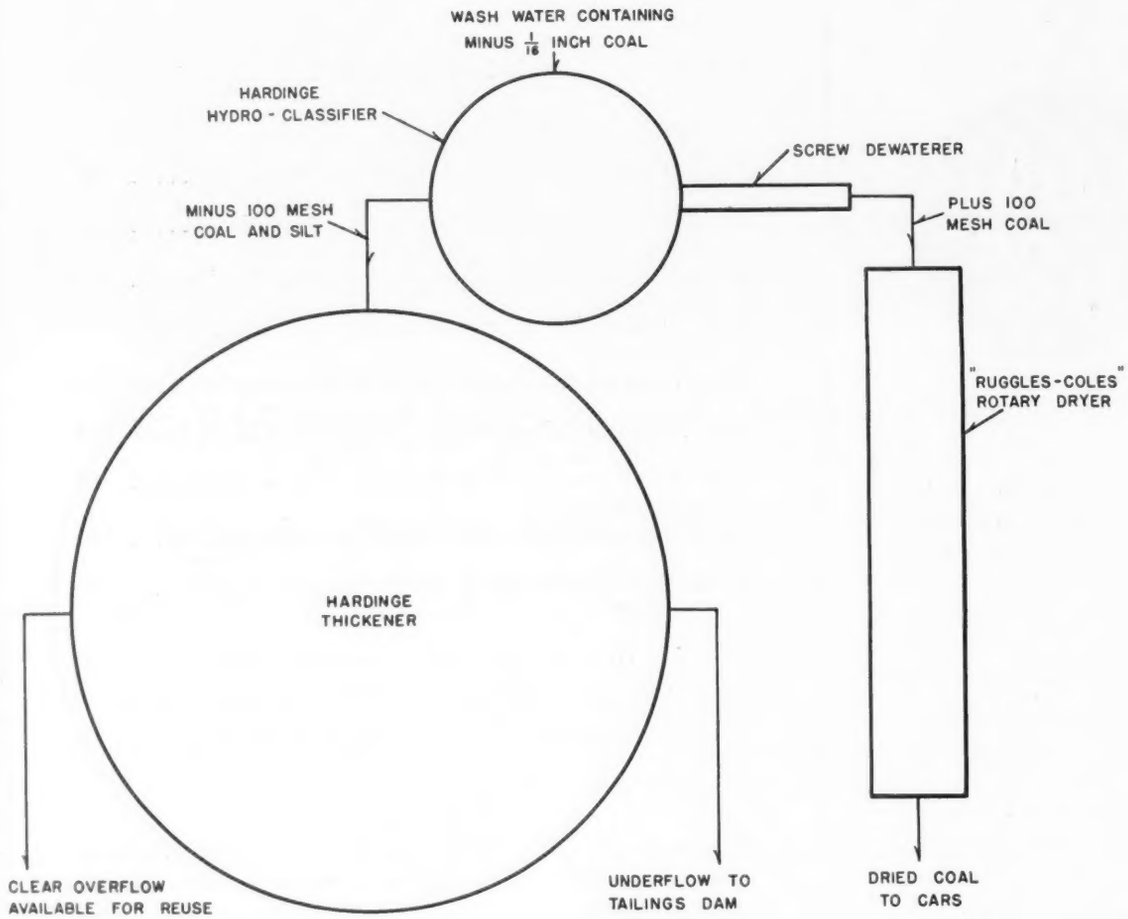
COMING COAL AGE ATTRACTIONS

• From driving gangways to the place of the company store in coal mining, COAL AGE issues in the immediate future will treat a variety of the many phases of coal production and related subjects. In the ever-important field of mechanical mining, plans now embrace a description of how one company develops openings in pitching coal with a special loading machine. Also, a description of how shaker conveyors are boosting tonnage in the Blocton No. 9 mine of the Black Diamond Coal Mining Co., in Alabama, is scheduled for an early issue, plus other material on the use of loading machines now in preparation.

• Company stores and how they fit into coal mining today will be supplemented by analyses of such other phases of operation as prevention of absenteeism, training of men, merchandising of coal and related subjects.

• Barricading as a means of saving lives after explosions and fires is now on the COAL AGE safety agenda, along with a discussion of grounding electrical equipment. In the latter article, George C. Barnes Jr. compares the advantages and disadvantages of grounding. Truck-mine operation, as carried on by the Sunshine Coal Co., in Indiana, is another article rounding out the COAL AGE service and scheduled for early publication.

RECLAIM FINE COAL—PREVENT STREAM POLLUTION



The Hardinge Hydro-Classifier removes the plus 100 mesh coal from the washwater. The coal is dewatered by a screw dewaterer in combination with the Hydro-Classifier and delivered to a "Ruggles-Coles" Rotary Dryer. The overflow from the Hydro, containing minus 100 mesh coal, is sent to a Hardinge "Auto-Raise" Thickener. A clear overflow from the thickener can be reused or sent to stream without danger of pollution. The thickener underflow containing minus 100 mesh coal and silt can be pumped to a tailings dam.

The Hydro-Classifier is equipped with an adjustable wier to permit changing the minimum size of coal overflowed.

Write for information and Bulletins 31-C & 16-C

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COMPANY, INCORPORATED - YORK, PENNSYLVANIA

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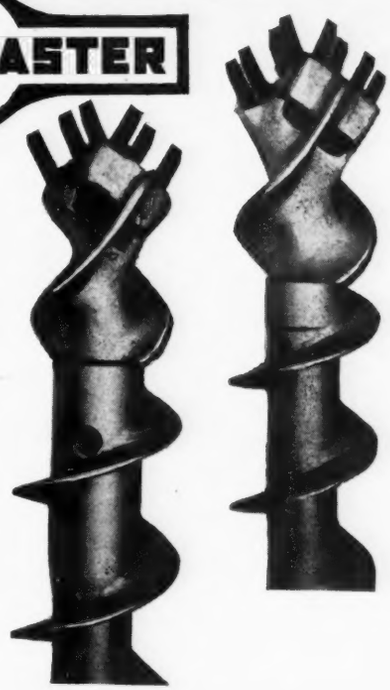
Lower DRILLING COSTS

FROM START

TO FINISH

COALMASTER



• You can not only start holes more quickly with COALMASTER Blast Hole Drilling Tools, but you speed up the work all the way through to the finish. Because the tools are light and free running your men do not tire readily and therefore are able to accomplish more and feel better when the day's work is done.

You get lower costs because your drill maintenance costs are less owing to the drills being underloaded rather than overloaded. Also, the holes are drilled in straight where you aim them and are not deflected by hard streaks and bands. Most of the scraping is eliminated because a COALMASTER Conveyor Auger really cleans while it drills.

COALMASTER TOOLS are made in sizes from 1½" up —to drill correct holes for all powder, CARDOX, AIR-DOX, Hydraulic, and special requirements. They are made in types for Handheld Drills—for Post and Machine-mounted Drills—for Strip Pit Drills.

SMOOTHER HOLES
STRAIGHTER HOLES
LESS VIBRATION
NO BIT BREAKAGE
LESS POWER CONSUMPTION
LESS WEAR ON AUGER
LESS DRILLING TIME PER HOLE
LESS DRILLER FATIGUE

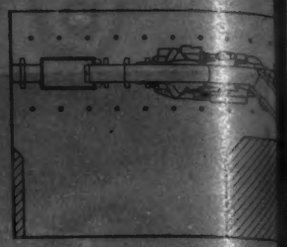
The experienced help of our engineers can be valuable to you now in your efforts to speed up and maintain coal production schedules. Our specialists will call on you without cost or obligation.

COALMASTER

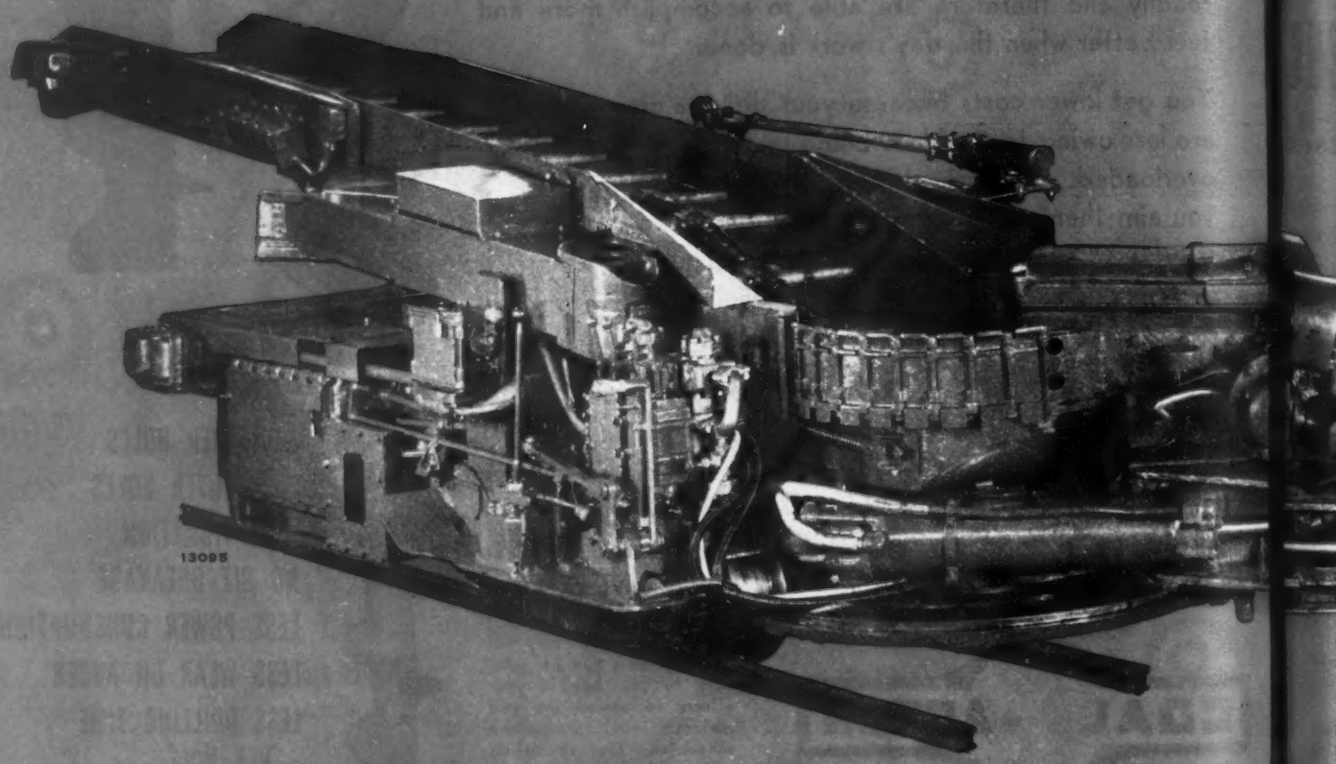
BLAST HOLE DRILLING Tools

CENTRAL MINE EQUIPMENT CO.
ST. LOUIS, MO.

SIMPLE STEPS TO HIGH CAPACITY LOADING



The Goodman 4



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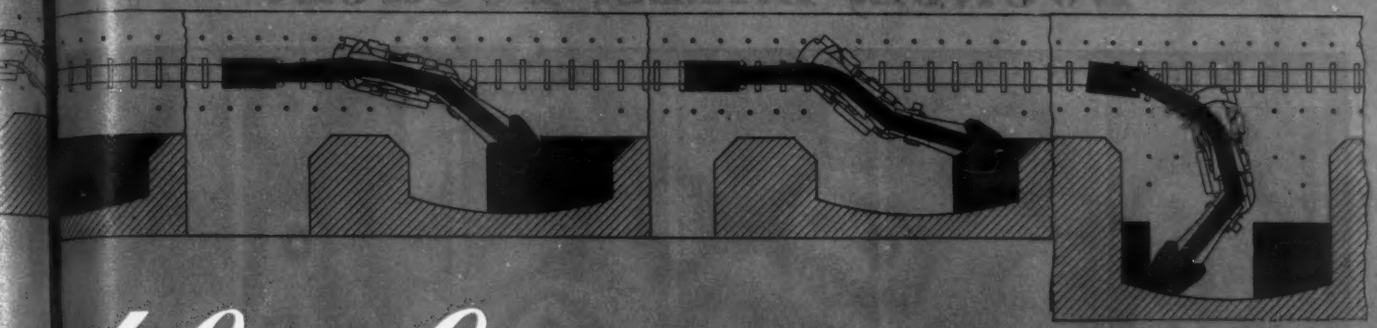
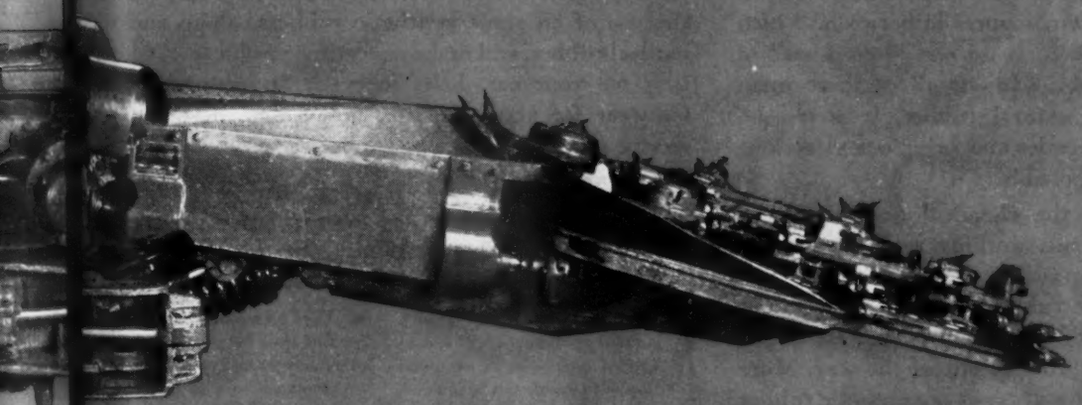
GOODMAN MANUFACTURING COMPANY

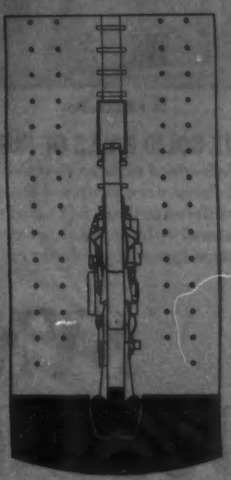


n460 Loader

The 460 is a fast machine that gets to working places quickly and loads out rapidly in a series of simple steps without preliminary maneuvering. It does a thorough job of loading from both straight track and sharp curves.

Control is hydraulic and may be right-hand or left-hand. Low over-all height affords a clear view of both sides of the loading head.

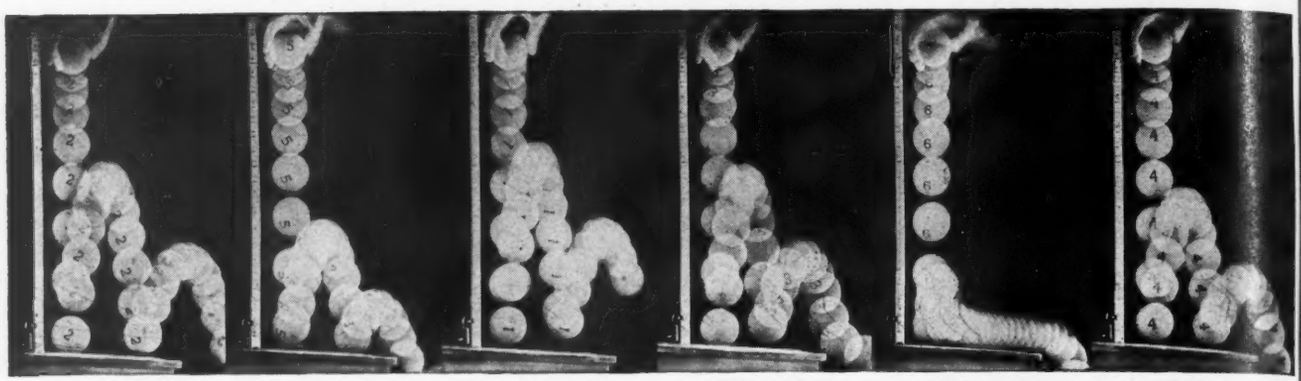




Sketches illustrate the use of a 460 loader in necking, and later driving a room where posting is close. Ease of handling and wide side swing of the front and rear conveyors (55° and 40° respectively) to either side of the track center line permit a profitable loading pace at all times.

HALSTED STREET AT 48TH • CHICAGO, ILLINOIS

BOUNCE, BALLS, BOUNCE!



2 (Synthetic) **5** (Synthetic) **1** (Natural) **3** (Synthetic) **6** (Synthetic) **4** (Synthetic)

SIX SOLID BALLS OF RUBBER caught in the act of bouncing by a high-speed camera that shoots at the speed of 1/6592 of a second. All of them were dropped from exactly the same height...and yet, what a difference there is! One of the balls is made of a compound containing natural rubber. Each of the other five balls contains one of the five major types of synthetic rubber.

Can you pick out which of the balls is made of the rubber used in making Army barrage balloons? Which rubber is being used today for making tires for military and essential civilian cars? Which one is used for bullet-sealing gasoline hose? Which for insulating tape? Which for making lacquer hose? Try your skill. You will find the answers to these questions in the box at the bottom of this page.

SYNTHETIC RUBBER IS NOT JUST ONE NEW KIND OF RUBBER

It is a whole family of new materials each with its own important uses

Bounce the balls as much as you please. One bounces high. One bounces low. One bounces in between. Which one is best? Actually, there is no one "best kind" of rubber for every purpose. Without all of these main types of synthetic and natural rubber, it would be impossible to beat our enemies and bring our victorious men home as swiftly as possible.

The rubber industry, the chemical and petroleum industries, the Government, working as a team, have made this achievement possible. By pooling all their experience with synthetic rubber, their resources, their skill, they have broken the threat of "rubber shortage" the Axis counted on to throw us out of the war. More than that, they have produced types of synthetic rubber that can do special jobs better than they have ever been done before... and for all time declared our independence from any future cut-off of the nation's rubber supply.

That is the true meaning of the synthetic rubber program. We are proud to have contributed our experience and our resources to doing this job... and doing it in record-breaking, history-making time.

What the future holds for synthetic rubber is not yet fully known. Yet this much is certain. When the war is won, the knowledge we are gaining every day through the use of all these synthetic rubbers, alone and with natural rubber, will make peacetime products... whether tires for your car, belts for your factory, waterproof footwear for your children, or gasoline hose for your service station...better and more serviceable than they have ever been before.

THEY MAY LOOK LIKE "SIX OF A KIND" BUT HERE ARE THE ANSWERS TO THE WAR JOBS EACH ONE CAN DO

1. This ball was made with natural rubber...today used in limited quantities in combination with synthetics because of our small reserve stock.

2. Used for tires, conveyor belts, fire hose and many other products. It is most like natural rubber and can be quickly and efficiently processed.

3. Used for making solvent and lacquer hose and other products where the utmost resistance to solvents is needed...better than natural rubber for these purposes.

4. Used for making bullet-sealing fuel hose for planes and for other uses where high resistance to aromatic fuels is essential.

5. Used for coating barrage balloons, tank linings, packings, acid hose, wires and cables. This type does not support combustion and is highly resistant to sunlight and chemicals.

6. Used for insulating tape, molded parts. It is soft, pliable and odorless.

Listen to United States Rubber Company program, featuring New York Philharmonic Symphony Orchestra, Carl Van Doren, and a guest star, broadcast over Columbia network every Sunday afternoon 3:00 to 4:30 P. M. Eastern War Time

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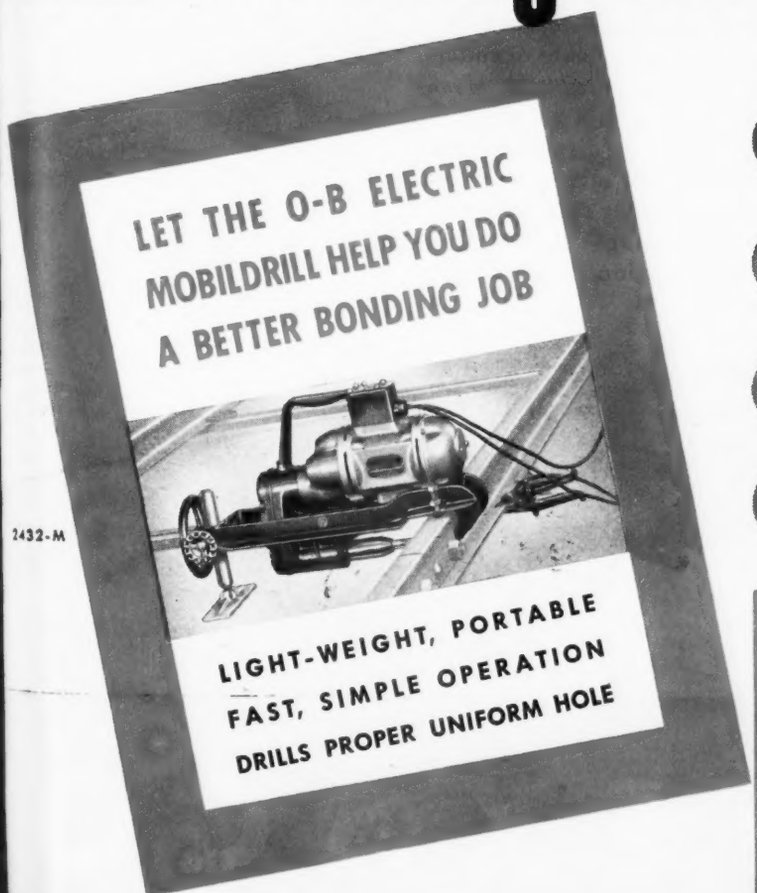
with O-B Wedge Bonding System


LET THE O-B ELECTRIC MOBILDRILL HELP YOU DO A BETTER BONDING JOB
2432-M
LIGHT-WEIGHT, PORTABLE
FAST, SIMPLE OPERATION
DRILLS PROPER UNIFORM HOLE

- Installed or reclaimed with a few hammer taps
- Permanent mechanical and electrical joint
- Applied by unskilled workmen
- Lowest installed cost per bonded joint

Ohio Brass

MANSFIELD, OHIO

Canadian Ohio Brass Co., Ltd., Niagara Falls, Ont.

KEEP BUYING WAR BONDS

WRITE FOR BOOKLET 764-M

MORE FUEL *Now!*

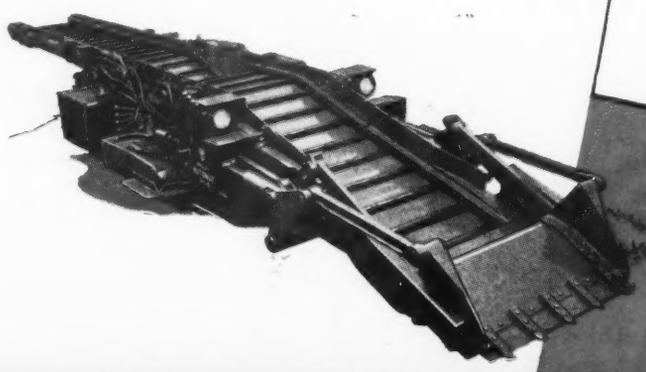
AMERICA'S war industry's need for coal requires the production of every possible ton, keeping every machine on the job, producing.

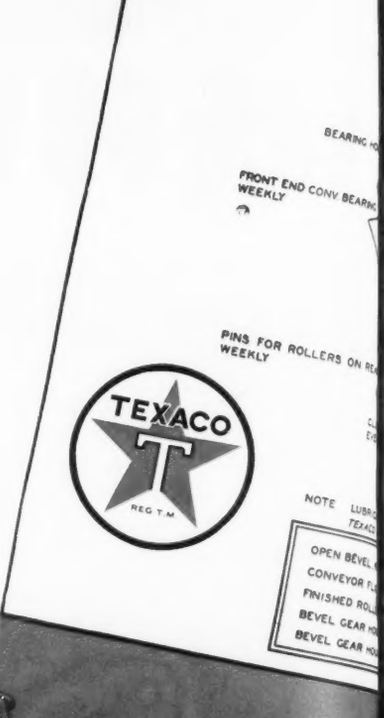
The kind of lubrication that keeps mechanized equipment at its best is made clear in *Maintenance Lubrication Charts* as offered by The Texas Company.

These charts show clearly just *where, when* and *with what* lubricant to service each lubrication point of various makes of cutters, loaders, locomotives, etc. . . . *with lubricants approved by the manufacturer.*

The actual size of these charts is 12″ x 18″, for displaying at all lubricating stations. Having them followed is a sure way to keep your equipment out of the repair shop, producing coal. Order the Charts you need by make and model, addressing—

The Texas Company, National Sales Division, Dept. C, 135 East 42nd Street, New York 17, N. Y.



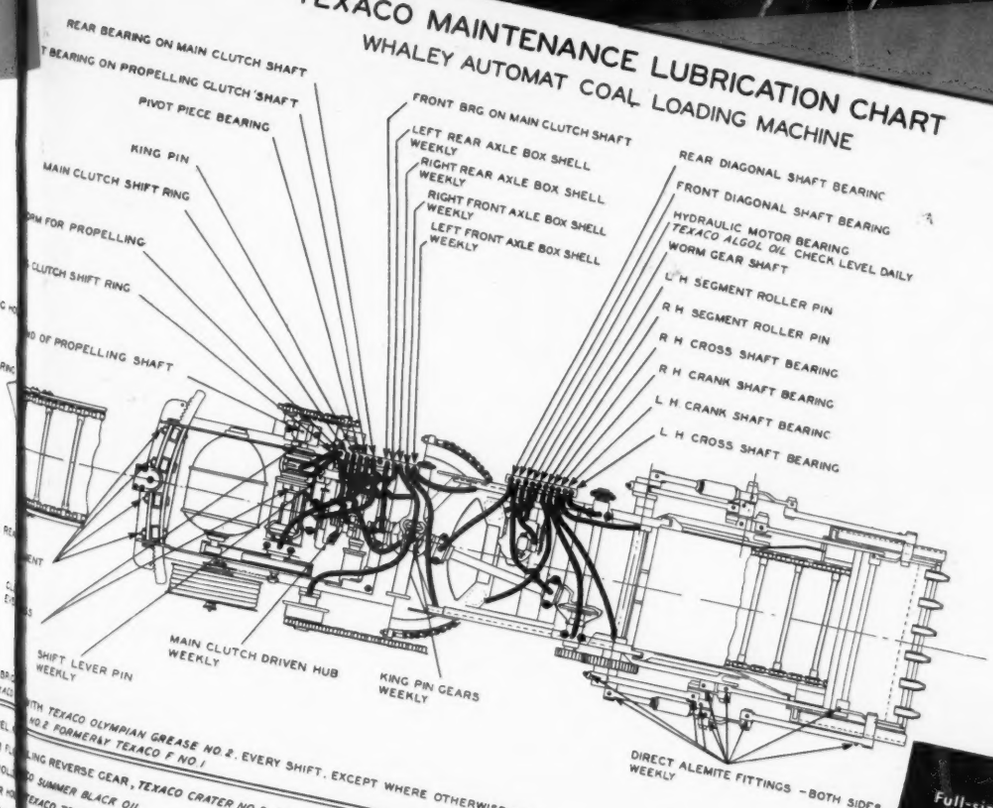


TEXACO

REG. T.M

TEXACO

TEXACO MAINTENANCE LUBRICATION CHART
WHALEY AUTOMAT COAL LOADING MACHINE


REAR BEARING ON MAIN CLUTCH SHAFT
T BEARING ON PROPELLING CLUTCH SHAFT
PIVOT PIECE BEARING
KING PIN
MAIN CLUTCH SHIFT RING
PM FOR PROPELLING
CLUTCH SHIFT RING
O OF PROPELLING SHAFT
FRONT BRG ON MAIN CLUTCH SHAFT
LEFT REAR AXLE BOX SHELL WEEKLY
RIGHT REAR AXLE BOX SHELL WEEKLY
RIGHT FRONT AXLE BOX SHELL WEEKLY
LEFT FRONT AXLE BOX SHELL WEEKLY
REAR DIAGONAL SHAFT BEARING
FRONT DIAGONAL SHAFT BEARING
HYDRAULIC MOTOR BEARING
TEXACO ALGOL OIL CHECK LEVEL DAILY
WORM GEAR SHAFT
L H SEGMENT ROLLER PIN
R H SEGMENT ROLLER PIN
R H CROSS SHAFT BEARING
R H CRANK SHAFT BEARING
L H CRANK SHAFT BEARING
L H CROSS SHAFT BEARING
SHIFT LEVER PIN WEEKLY
MAIN CLUTCH DRIVEN HUB WEEKLY
KING PIN GEARS WEEKLY
DIRECT ALEMITE FITTINGS - BOTH SIDES WEEKLY

TH TEXACO OLYMPIAN GREASE NO 2. EVERY SHIFT. EXCEPT WHERE OTHERWISE NOTED
O 2 FORMERLY TEXACO F NO 1
NG REVERSE GEAR, TEXACO CRATER NO 2 AS NEEDED
O SUMMER BLACK OIL
EXACO TEXOL "D" WORK INTO JOINTS - AS NEEDED
ACO MARFAK NO 0 PACKED
ME, TEXACO MARFAK NO 0 PACKED

MOTOR, TEXACO MARFAK NO 1 EVERY TWO WEEKS - DO NOT OVERFLOW WITH GREASE
CHAIN CASES FOR MOTOR DRIVE CHAIN, TEXACO MARFAK NO 0 AS NEEDED
WORM GEAR HOUSING ON JIB, TEXACO MARFAK NO 0 PACKED
WORM GEAR HOUSING UNDER MAIN FRAME, TEXACO MARFAK NO 3 PACKED
HYDRAULIC SYSTEM, TEXACO ALGOL OIL AS NEEDED

Full-size, 12" x 18" Charts are available covering prominent makes of underground machinery. Order by make and model today, using Company letterhead, please

Lubricants FOR THE COAL MINING INDUSTRY

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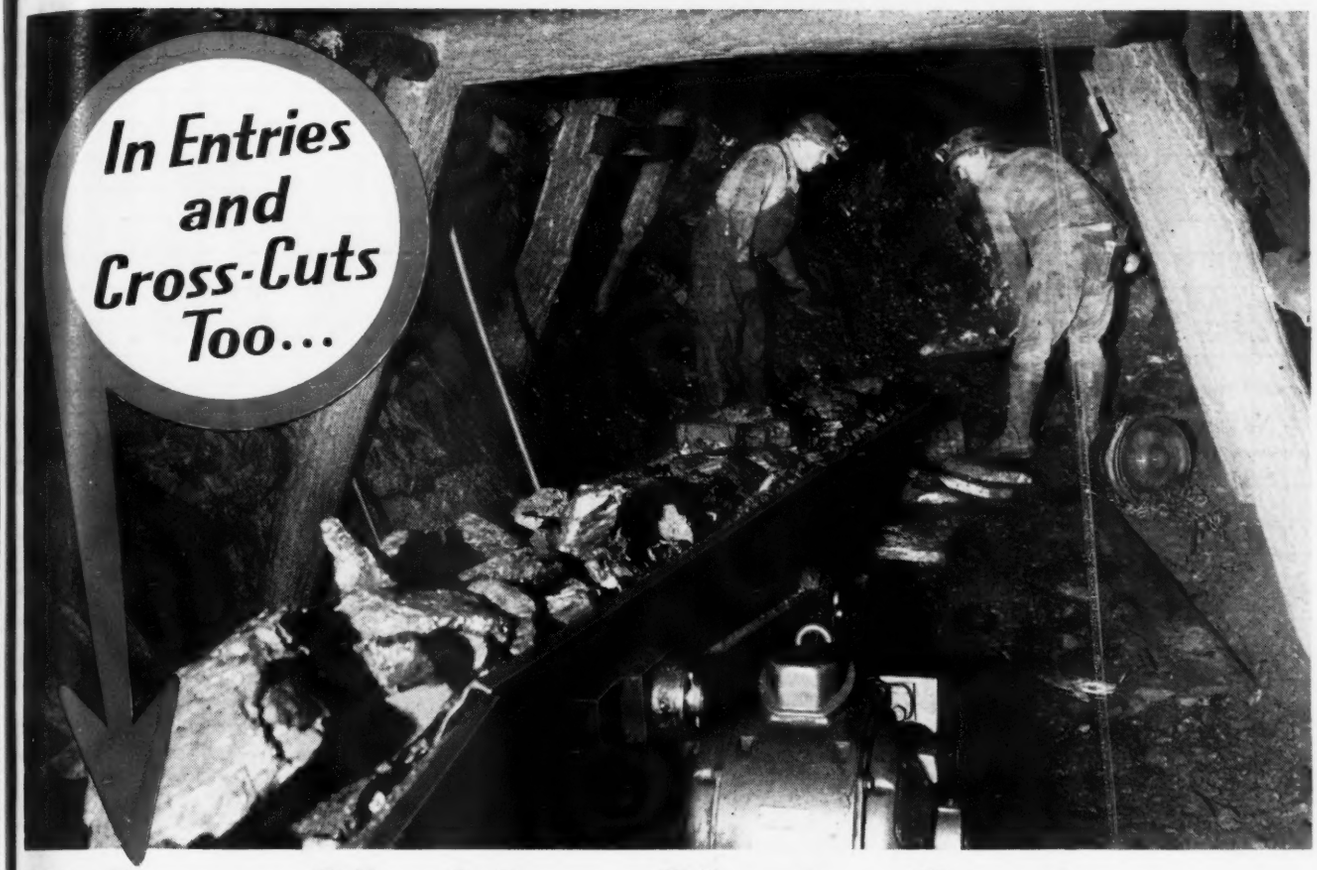
The day this Allis-Chalmers, 2-Cycle Diesel tractor and scraper "go at it" on your operation . . . the dirt will really start to move. Whether the job is rebuilding that bad section of road . . . stripping, excavating, or other similar work . . . you will marvel at the power and speed of this outfit. There's less tugging to load . . . less gear shifting. Smooth 2-Cycle Power hangs on with steamlike tenacity. You get heaping loads in record time . . . rear-dump them wherever you desire — on the level, over a slope, or other ordinarily hard-to-get-at places. Makes short work of tough jobs. Saves you plenty, too. Fewer repairs are necessary. Operates on ordinary Diesel fuels. Add a bulldozer, and you can work both ends . . . multiply its usefulness . . . subtract from your cost. Rates high with experienced operators.

If you qualify under government regulations, you can put this fast-moving, money-saving Diesel to work now. Fifteen per cent of our crawler tractor production is released for essential civilian use. See your Allis-Chalmers dealer now about the availability of equipment for your needs.

The above HD-14, 2-Cycle Diesel, with a Gar Wood, 2-wheel scraper, gets quick results for the Dye Coal Co., Hopedale, Ohio — shown stripping coal of overburden.

ALLIS-CHALMERS
TRACTOR DIVISION · MILWAUKEE · U. S. A.

2-Cycle THE MODERN DIESEL POWER

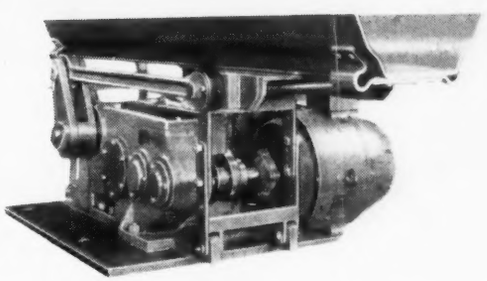


Vulcan Shaking-Chute Conveyors

Cut Labor Costs and Boost Production

Modern applications of Vulcan Shaking-Chute Conveyors not only eliminate the back-breaking drudgery of loading coal into mine cars from rooms and long-wall working faces, but also in entries, cross-cuts and headings. Many ingenious and effective methods have been developed by Vulcan Engineers—some of which are only possible with Vulcan equipment.

Write us regarding any coal or rock handling requirements. We manufacture not only shaking-chute conveyors, but also a complete line of underground chain conveyors and scraper loaders, so that our engineers can afford to be absolutely impartial in their recommendations. No charge, or obligation of any kind, for constructive suggestions and estimates.



Vulcan Shaking-Chute Conveyor Drives are manufactured in several types and sizes for operation by motors ranging from 5 to 35 hp. We also manufacture a complete line of chutes, rollers, screw-jacks and other accessory equipment. Bulletins on request.

VULCAN IRON WORKS

Established 1849

Main Office and Works WILKES-BARRE, PA., New York Office 50 Church St.

Heavy-Duty Electric Hoists
Self-Contained Hoists
Scraper Hoists
Car-Spotting Hoists
Room Hoists

Shaking-Chute Conveyors
Chain Conveyors
Cast-Steel Sheaves and Gears
Cages, Skips and Gunboats
Coal-Preparation Equipment

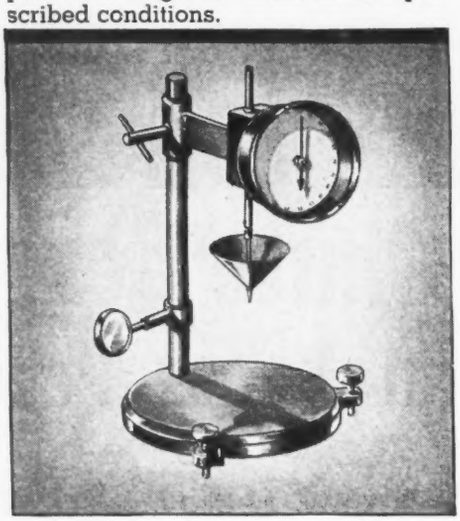
Steam Locomotives
Diesel Locomotives
geared and electric drive
Gasoline Locomotives
geared and electric drive

Load-Carrying Larries
Rotary Kilns, Coolers and Dryers
Crushers and Pulverizers
Briquetting Machines
Ball, Rod and Tube Mills

PENETRATION

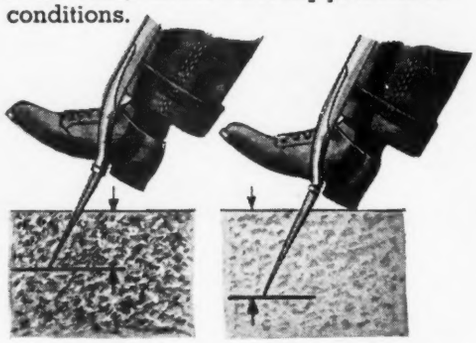
TIDEWATER LUBRICANIA

DEFINITION: The consistency or hardness of lubricating greases is generally expressed by the depth to which a standardized cone-shaped weight will penetrate the grease under definite prescribed conditions.



PENETRATION TEST: Following a carefully prescribed procedure the grease is brought to a temperature of 77°F. and the tip of the penetrometer cone is lowered until it just touches the surface of the grease. The cone is then quickly released for five seconds and the depth of travel of the cone is carefully noted. The average of five such tests at different points of the grease surface, measured in tenths of a millimeter, is reported as the Penetration or Consistency of the grease at 77°F.

If the grease was not worked before the test, it is reported as the "unworked" consistency. If the "worked" consistency is to be determined, the sample is first worked under carefully prescribed conditions.



EXAMPLES:

	A.S.T.M. "Worked" Consistency (77° F.)
Soft (No. 1) Cup Grease	310-340
Medium (No. 3) Cup Grease	220-250
Heavy (No. 4) Cup Grease	175-205
Hard (No. 6) Cup Grease	85-115

SIGNIFICANCE: The "worked" penetration is an indication of the tendency of the grease to leak or drip from a bearing, or its ability to flow under pressure in feed lines. However, the resistance to flow through narrow bearing clearances or the ability to support bearing loads are more nearly proportionate to the viscosity characteristics of the oil used in the manufacture of the grease. The "unworked" penetration of greases is subject to many variables and except for very hard greases has little significance.

OIL IS AMMUNITION
USE IT WISELY!

DRUMS! DRUMS! DRUMS!
War needs make it extremely important that all empty drums be returned immediately.

INDUSTRIAL TYCOL OILS-GREASES

SCIENTIFICALLY ENGINEERED FOR EVERY INDUSTRIAL USE

TYCOL

*This is the 7th of a series of informative messages concerning the meaning and significance of commonly used tests and terms employed to describe the characteristics of lubricating oils.

Tycol greases are scientifically compounded for all lubricating purposes, from textile spindles to steel rolling mills. Tycol greases when used for the recommended purpose afford maximum lubrication with minimum friction and leakage.

Whatever you need — whether it be a lubricating oil or grease — Tycol lubricants provide complete protection at low cost. Let a Tide Water engineer help you select the lubricant best suited to your job.

TIDE WATER

ASSOCIATED OIL COMPANY

MAKERS OF THE FAMOUS VEEDOL MOTOR OIL
Eastern Division: 17 Battery Place, New York 4, N. Y.
Principal Branch Offices:
Boston, Philadelphia, Pittsburgh, Charlotte, N. C.

INDUSTRIAL LUBRICANTS

WAR-WORKER *and Record-Breaker*

Coal wears no uniform.

It goes off to the wars in the same garb in which it sees the light of day.

It needs no training, no fundamental change to ready it for its job — and it goes to work with equal readiness in small family grate or modern, super-efficient, monster industrial furnace.

And, for all its man-made difficulties, coal itself is doing its full part to help win the war.

It was on the job when the first bomb hit Pearl Harbor, and will still be there when the last fighting man steps off the train at his home station.

Today it develops more power — hauls more trains—warms more homes, offices and buildings—turns more wheels—generates more light and power than any other fuel—and does it at lower cost.

Though the armed forces and other war industries have drawn some 70,000 trained men from the mines, *more coal was brought to the surface in 1942 than in any previous year.*

Again in 1943, the first nine months of the year set a new record for coal production, topping any like period in history.

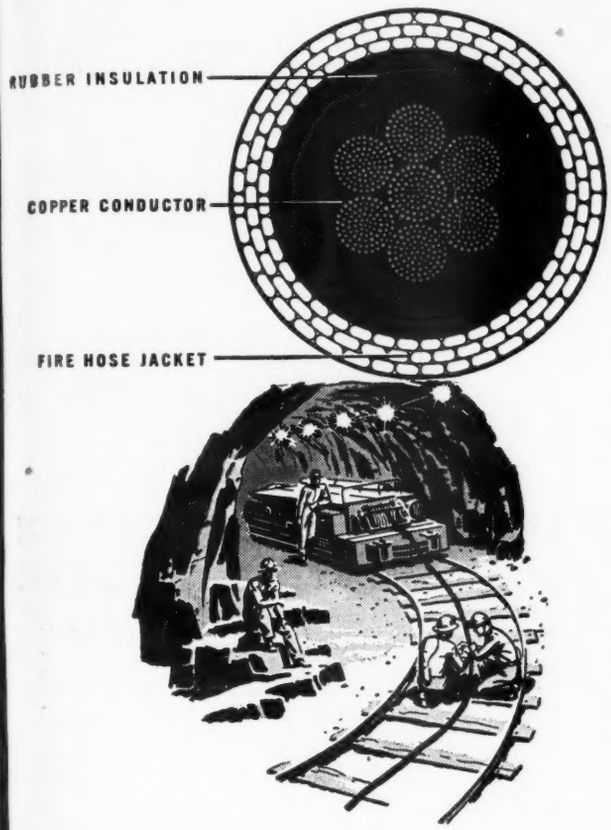
Coal is "public energy No. 1," now as in the past—and those who produce it work shoulder to shoulder with other American industries in an honest effort to meet their every obligation as employers, as suppliers to the public—and as good citizens.

BACK THE ATTACK • WITH WAR BONDS

BITUMINOUS COAL *Institute*

60 East 42nd Street New York 17, N.Y.

Duracord helps two ways...



1. Saves up to 50% rubber in mining cable

2. Saves down-time losses in vital mine production

THERE is nothing "ersatz" about Duracord*; it is a cable construction developed during the last war to meet the need for heavy-duty cords and cables . . . a need it is *currently* filling not only in mines but also industrial plants and shipyards.

The Duracord covering is woven like a fire hose—*not braided.* This tough yet flexible cover replaces the rubber jacket on all-rubber cords making possible rubber savings as high as 50%.

For further information, please send us your inquiries.

SUNEX SECURITYFLEX* TO WAR

This well-known all-rubber companion to Duracord has been preempted for the toughest kind of jobs in the war effort where all-rubber cord is mandatory. Until peace, its use will be strictly regulated. 42264

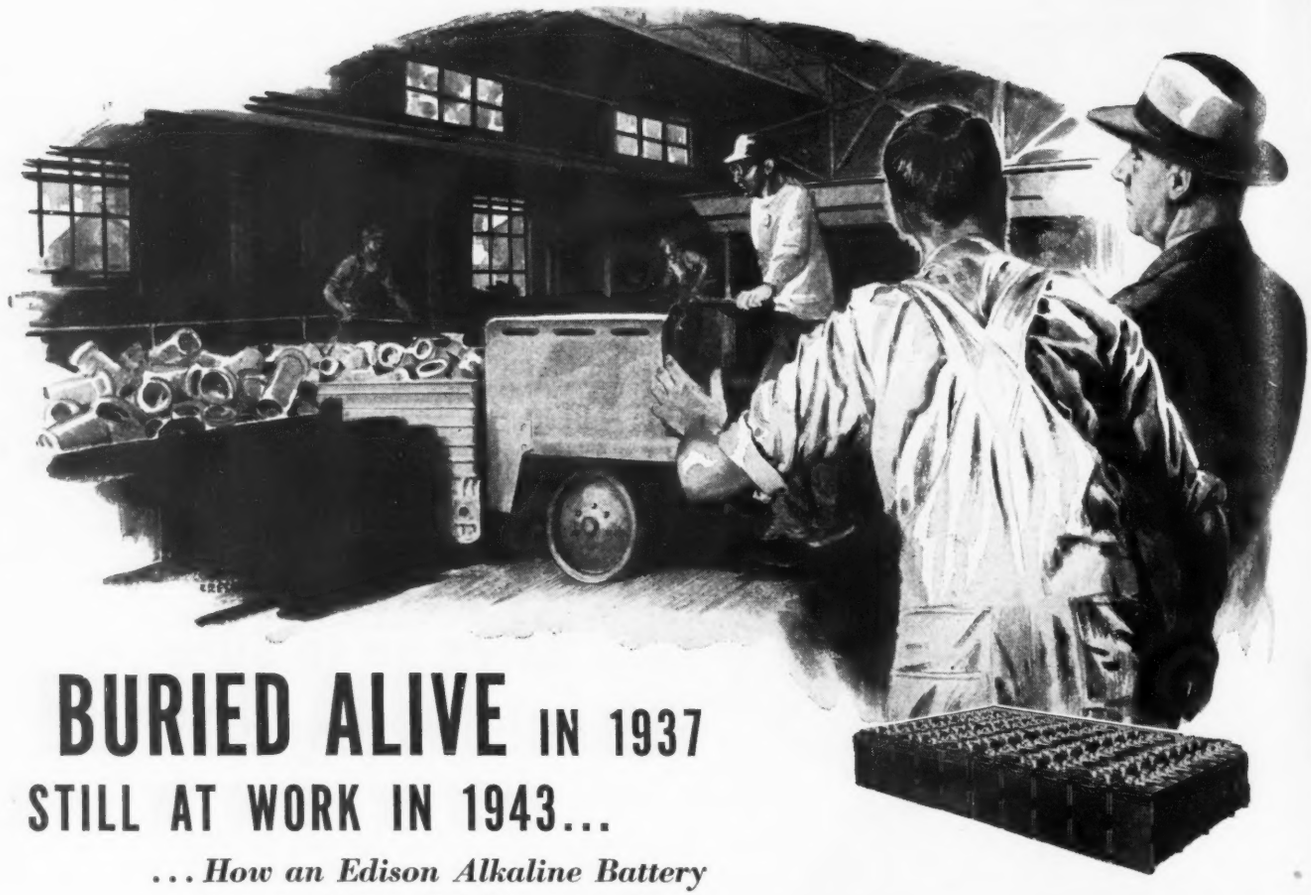
*Reg. U.S. Pat. Off.

Two marks of achievement—the cherished Navy "E" (awarded to two of our plants) for achievement in production...The Anaconda trade-mark for achievement in quality.

ANACONDA WIRE & CABLE COMPANY
Subsidiary of Anaconda Copper Mining Co.
General Offices: 25 Broadway, New York, 4
Chicago Office: 20 North Wacker Drive, 6
Sales Offices in Principal Cities

Sunex Securityflex and Duracord

ANACONDA WIRE & CABLE COMPANY



BURIED ALIVE IN 1937
STILL AT WORK IN 1943...

... How an Edison Alkaline Battery Survived Use, Dis-Use and Abuse

In 1937, a midwestern foundry changed hands after being shut down six months. The electrician of the new owners, in the course of putting the industrial trucks into operation, found one of the batteries buried under a mound of earth beside an open trench.

He knew it must have been there at least six months and, although it was an Edison Alkaline Battery, he was naturally doubtful whether it was still serviceable. Nevertheless, he ordered it cleaned, painted and charged. Much to his surprise, it performed satisfactorily in every way when put into one of the trucks. Now, six years later, the electrician tells an Edison engineer that the same battery is still in regular service.

Edison Alkaline Batteries are meant to stand use—long use and hard use, in mines, railroads and industry. They can also stand disuse, indefinitely, if discharged, short-circuited and properly stored. But the fact that they can, and often do, survive outright abuse is striking evidence of their great reserve of dependability under all conditions.

Some of the unique characteristics which enable the Edison Alkaline Battery to stand up under use, disuse and abuse are cited in the column at the right.

ADVANTAGES OF THE EDISON ALKALINE BATTERY for users of MINE LOCOMOTIVES and SHUTTLE CARS

- ★ It is durable mechanically. High strength steel construction is used in the container, grids, pole pieces, etc. The electrolyte is a preservative of steel. It requires no renewal of separators throughout its long life.
- ★ It withstands temperature extremes. It is not damaged by freezing. Free air spaces on all sides of all cells provide ventilation for rapid cooling under high temperature conditions.
- ★ It is free from ordinary battery troubles. It is not subject to sulphation, shedding of active material, buckling of plates, jar breakage or other common causes of battery failure.
- ★ It is foolproof electrically. It may be short-circuited, over-charged, over-discharged, or even accidentally charged in the reverse direction without injury.
- ★ It can be charged rapidly. It may be charged at full normal rate throughout the entire length of charge. It requires no equalizing.
- ★ It does not require critical adjustment of charge rates. It can be charged directly from the d-c mine power supply. It has no finish-rate limitations.
- ★ It is simple to maintain. Merely charge adequately, add pure water, keep clean and dry.
- ★ Its tray assembly and cell connections are extremely simple.
- ★ Its life is so long that its annual depreciation is less than that of any other type of storage battery.

EDISON STORAGE BATTERY DIVISION, THOMAS A. EDISON, INCORPORATED, WEST ORANGE, NEW JERSEY

Edison

ALKALINE BATTERIES

156-42

Patented and Patents Pending. Also licensed under Patents Nos. 1706961, 1706962, 1707132, 1707133, 1

JEFFREY 29-U UNIVERSAL COAI

Patented and Patents Pending. Also licensed under the patents of E. C. Morgan. Patents Nos. 1706961, 1706962, 1707132, 1707133, 1953325, and 1953326.

UNIVERSAL COAL CUTTER

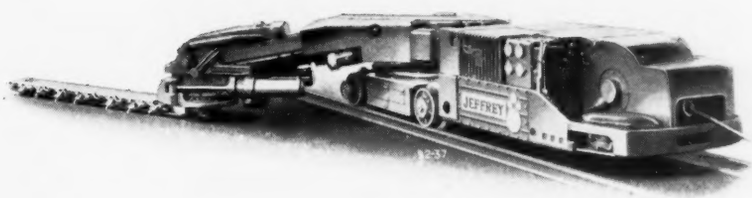
A high-tonnage unit, track type or crawler mounted. Cuts anywhere in the seam . . . is properly engineered with minimum overall dimensions and hydraulically-operated controls conveniently located.

80% of Bituminous Coal Produced in the United States is cut by Electric Coal Cutters

1943 GOAL 600,000,000 TONS

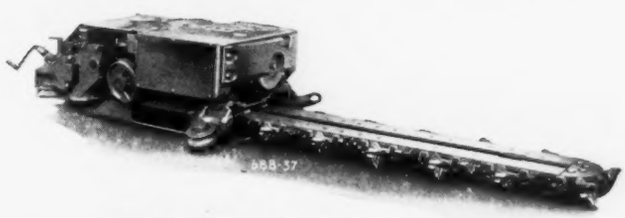
JEFFREY

Boosts Coal Production with a complete line of Coal Cutting Machines



JEFFREY 29-U Universal Coal Cutter

JEFFREY 35-L Low Vein Coal Cutter



JEFFREY 35-B Shortwall Coal Cutter

IT TAKES
30 TONS OF
COAL FOR THE STEEL
USED IN ONE
Flying Fortress

BUY
WAR
BONDS

IN 1942 IT REQUIRED 150,000,000 TONS OF COAL TO MAKE 90,000,000 TONS OF STEEL

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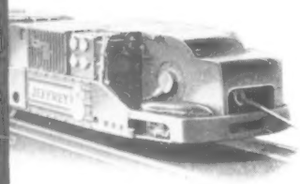
Machines



Coal Cutter

Coal Cutter

Coal Cutter

NS OF COAL
STEEL

Jeffrey

SERVES THE INDUSTRY
BELOW AND ABOVE GROUND
FROM FACE TO RAILROAD CAR

CUTTERS
DRILLS
LOADERS
LOCOMOTIVES
FANS
CONVEYORS
BLOWERS
JIGS
CRUSHERS
SCREENS
RENEWAL PARTS

THE JEFFREY MANUFACTURING COMPANY

Established in 1877

912-99 NORTH FOURTH STREET, COLUMBUS 16, OHIO

Sales Offices:	Baltimore Birmingham Boston Buffalo	Chicago Cleveland Cincinnati Detroit	Denver Harlan Houston Huntington	Milwaukee New York Philadelphia Pittsburgh	Scranton St. Louis Salt Lake City
Service Stations:	Pittsburgh Harlan, Ky.	Birmingham St. Louis	Logan-Beckley W. Va.	Scranton	
Foreign Plants:	Jeffrey Mfg. Co., Ltd. Montreal, Quebec	British Jeffrey-Diamond, Ltd. Wakefield, England	Jeffrey-Galion (Pty), Ltd. Johannesburg, S. A.		

The Problem of a Tender Roof Led to Lower Costs

and Increased Production — Through SYNERGISM*

A well-known Illinois mine was having trouble holding the top.

Atlas representatives, in close cooperation with the mine foremen and supervisors, studied the problem. One idea led to another—idea sparked idea—until a true "2 + 2 = 5" result was achieved—lower costs, increased production and better roof conditions, all in one stroke.

The verdict was:

"It leaves the roof in much better condition"

"Bottom holes cut straight across"

"Coal loads out better than before"

"Places square up as they should"

"Better than 10% saving in explosive cost"

***Synergism**—*The meeting of minds "clicking together" from the impact of ideas, to give a result greater than the sum total of the ideas expressed—a "2 plus 2 equals 5" result.*

Such synergistic thinking with our customers is yielding outstanding results. If you have a blasting problem—or feel that your present results may be improved—we would like to try Synergistic thinking with you. Synergism can usually arrive at "2 + 2 = 5" answers to the problems of improved operation and increased production.

ATLAS EXPLOSIVES

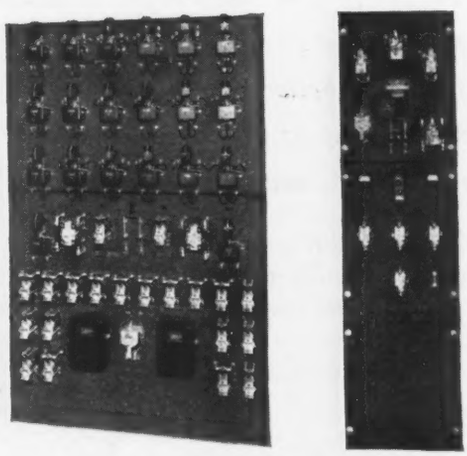
"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

ATLAS POWDER COMPANY, Wilmington 99, Del. • Offices in principal cities • Cable Address—Atpowco

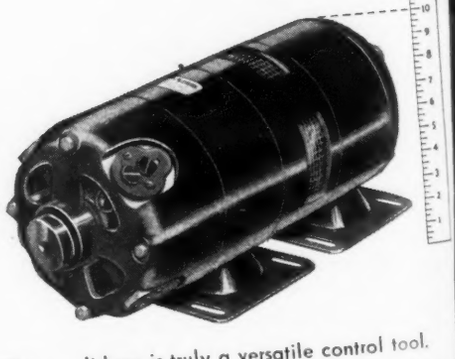
Thousands of E

This 20-cu-yd shovel, having exceptionally long reach and high lift, is making a remarkable record for tonnage handled. Amplidyne control permits the operator to make fast getaways, without straining the equipment.



CONTRAST IN CONTROL

(Left) Conventional mine-hoist control panel. (Right) Control for similar hoist with new amplidyne system. Graphically, this shows how amplidynes assume the duties of field-current contactors, associated relays, and the many current-carrying contacts.



The amplidyne is truly a versatile control tool. Responding instantly to electric signals in the order of 3 watts, it furnishes a controlled flow of large amounts of power, amplifying the signal as much as 10,000 to 1.

This 35-
strippin
equipped
plidynes
hoist, swi
motions.
provide
during
minimize
and load
plugging

EXTRA YARDS per month

G-E amplidyne control helps world's biggest stripping shovels meet today's unprecedented demands for bituminous output

This 35-cu-yd electric stripping shovel is equipped with G-E amplidynes for control of hoist, swing, and crowd motions. Amplidynes provide extra power during motoring, yet minimize overshooting and load peaks during plugging and stalling.

Capable of swinging 60-ton loads at the end of a 60-ft dipper stick, these are the largest-capacity shovels in the world. Yet in spite of their great size, operation is smooth, accurate, and fast.

How do G-E amplidynes provide such control? How do they help one of these giants scoop away overburden at better than 35 cubic yards a minute? Amplidynes perform a four-fold service:

First, they provide faster acceleration and deceleration for the hoist, swing, and crowd motions.

Second, by their forcing action, amplidynes provide higher average cycle speeds.

Third, they assure smooth, uniform application of motor power at all speeds.

Fourth, they act as safety valves, limiting the motor torque to protect electrical and mechanical equipment during stalling or fast reversals.

Shovel control is but one example of where amplidynes are speeding "more coal for Victory." Mine-hoist control is another. Still a third is the quite different application of amplidynes to power-factor regulation. Here, amplidynes are serving to increase the capacity of long power lines to open-pit operations, by improving voltage conditions.

For experienced engineering assistance on any phase of mine electrification—amplidynes, mining locomotives, switchgear, transformers, motors, or controls—get in touch with our local office. *General Electric Company, Schenectady, N. Y.*

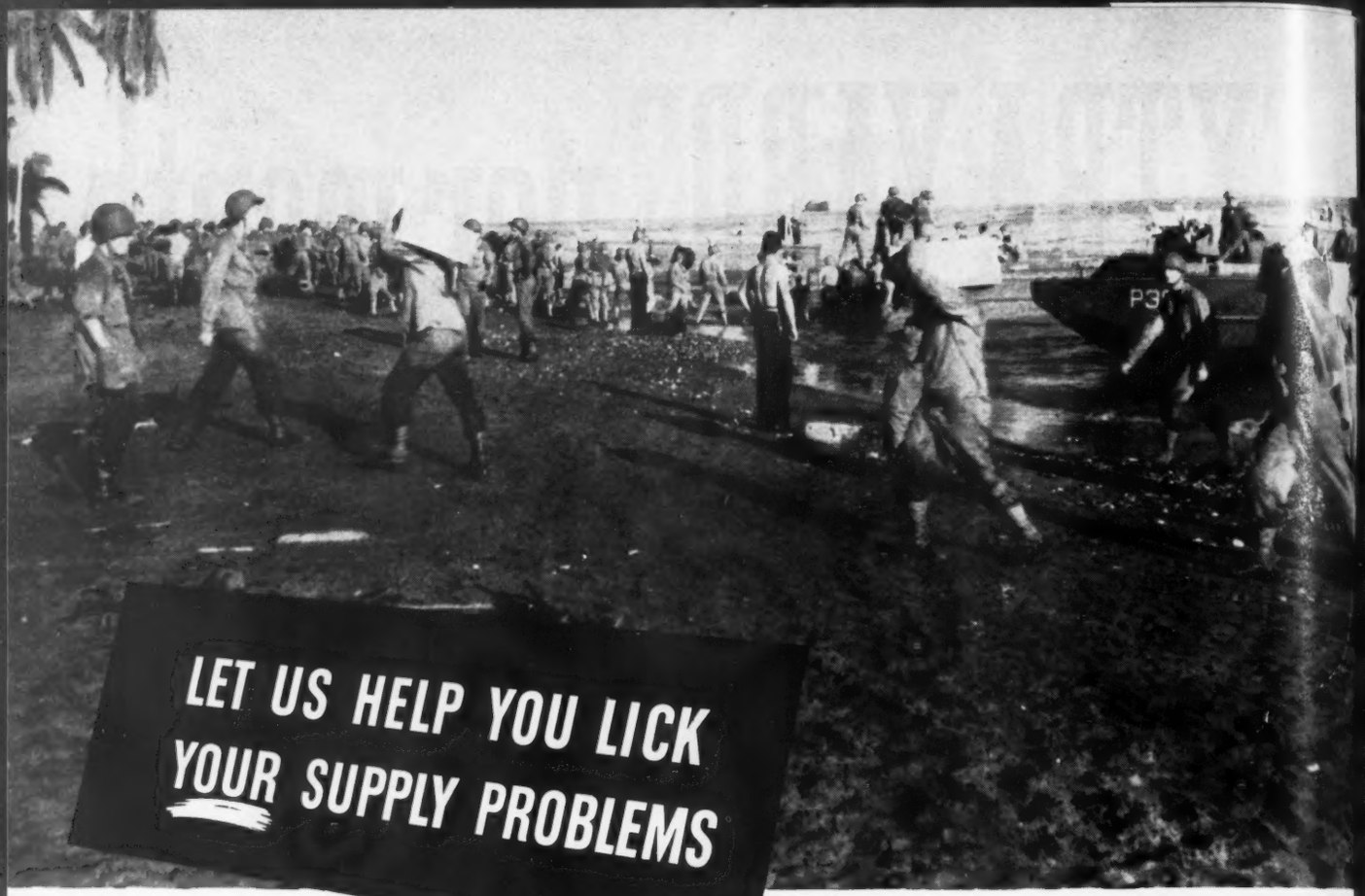
***FREE** thirty-six page book telling and showing how the amplidyne works, and detailing many of its present applications—including electric shovels. Ask for our bulletin, GEA-4053.*

GENERAL ELECTRIC

657-25-204

AMPLIDYNES

The best investment in the world is in this country's future—
BUY WAR BONDS



LET US HELP YOU LICK YOUR SUPPLY PROBLEMS

Call us for General Purpose Steels

Our business is to help you keep war production moving, so if you need steel we'll get it to you in a hurry if at all possible—subject, of course, to priority restrictions. We can't always fill *all requests* because of material shortages, but a call to us has solved many a supply problem. If you need steel, steel products, machinery or equipment, try us. Write, phone or wire our nearest warehouse. You will get prompt, courteous attention.

We Welcome Inquiries On National Emergency Alloy Steels

These new steels have made it possible to meet many critical conditions imposed by the shortage of strategic alloys. They have given satisfactory results—in fact, have sometimes performed even better than the steels previously used.

We'll gladly assist you in determining the grades best suited to your needs. Get in touch with our nearest warehouse.

Get Extra Service From Your Equipment

Do you find equipment wearing out in areas subject to great abrasion or corrosion—while the rest of the equipment is still in good shape? You can prevent this premature breaking-down of equipment—save time, money and metal—by depositing a tough, wear-resisting surface over such areas with Bergstrom Hard Surfacing Electrodes.

These electrodes are easy to use. Applied in any position, AC or DC, with freedom from porosity. Freedom from scale eliminates brushing and chipping.

Write for Free Information

We will send you full information, including an outline of the purposes of each of the six types of electrodes available.

UNITED STATES STEEL SUPPLY COMPANY

USS

STEELS

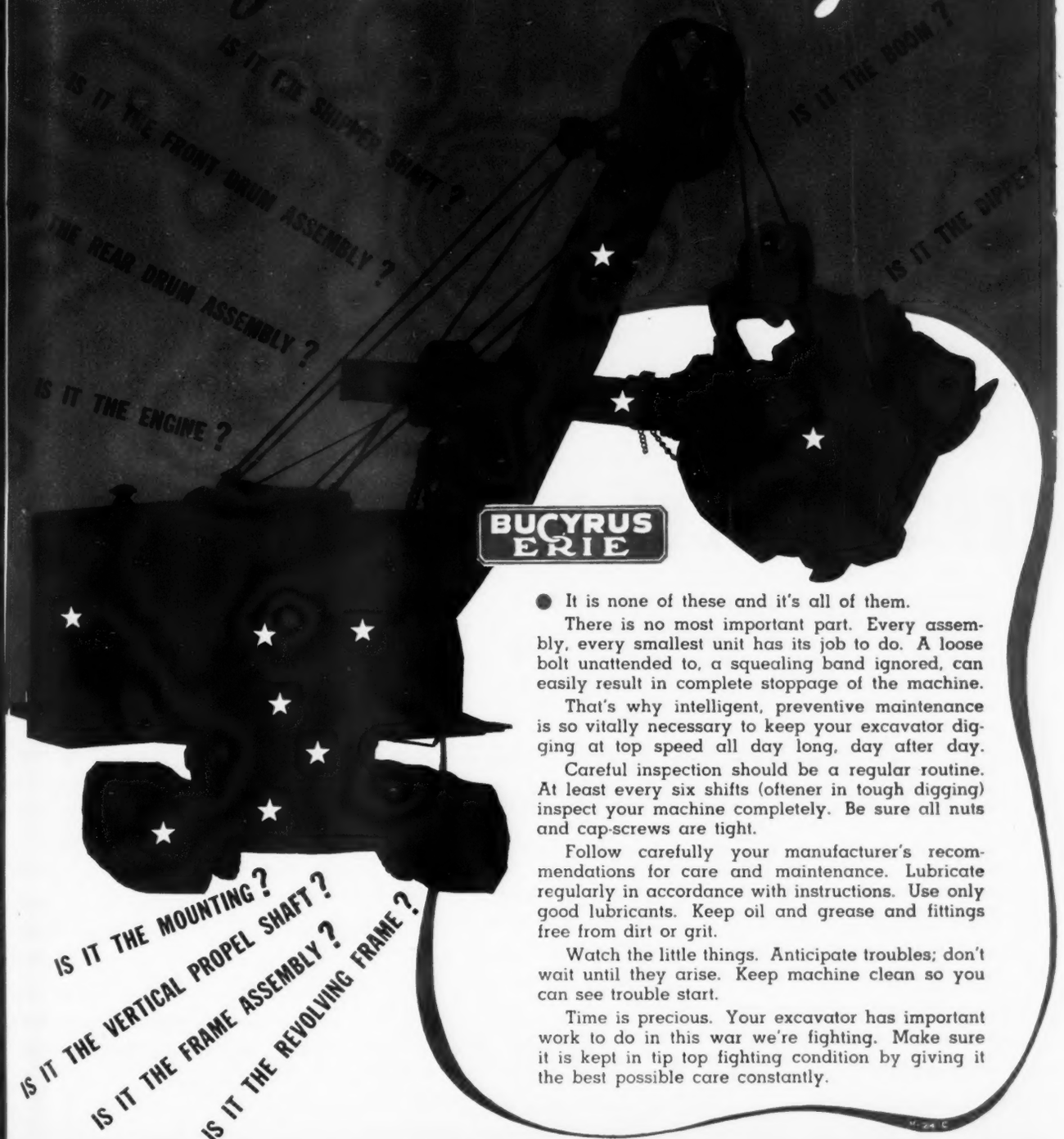
SERVICE

Send for a FREE copy of our new Stock List and Reference Book—just off the press.

CHICAGO (90),	1319 Wabansia Ave., P. O. Box MM	Teletype CG. 605	BRUnswick 2000
BALTIMORE (3),	Bush & Wicomico Sts., P. O. Box 2036	Teletype BA. 183	GILmore 3100
BOSTON (34),	176 Lincoln St., Allston, P. O. Box 42	Teletype BRTN. 10	STAdium 9400
CLEVELAND (14),	1394 E. 39th St.,	Teletype CV. 153	HEnderson 5750
MILWAUKEE (1),	4027 West Scott St., P. O. Box 2045	Teletype MI. 587	MItchell 7500
NEWARK (1), N.J.,	Foot of Bessemer St., P. O. Box 479	Teletype NK. 74	Bigelow 3-5920
		REctor 2-6560	BErgen 3-1614
PITTSBURGH (12),	1281 Reedsdale St., N. S.	Teletype PG. 475	CEdar 7780
ST. LOUIS (3),	21st & Gratiot Sts.,	Teletype SL. 384	MAin 5235
TWIN CITY,	2545 University Ave., St. Paul (4), Minn.	Teletype STP. 154	NEstor 2821

UNITED STATES STEEL

What is the Most Important Part of an Excavator?


IS IT THE BOOM?
IS IT THE DIPPER?
IS IT THE CAB SHIPPER SHAFT?
IS IT THE FRONT DRUM ASSEMBLY?
IS IT THE REAR DRUM ASSEMBLY?
IS IT THE ENGINE?
BUCYRUS ERIE
IS IT THE MOUNTING?
IS IT THE VERTICAL PROPEL SHAFT?
IS IT THE FRAME ASSEMBLY?
IS IT THE REVOLVING FRAME?

● It is none of these and it's all of them.

There is no most important part. Every assembly, every smallest unit has its job to do. A loose bolt unattended to, a squealing band ignored, can easily result in complete stoppage of the machine.

That's why intelligent, preventive maintenance is so vitally necessary to keep your excavator digging at top speed all day long, day after day.

Careful inspection should be a regular routine. At least every six shifts (oftener in tough digging) inspect your machine completely. Be sure all nuts and cap-screws are tight.

Follow carefully your manufacturer's recommendations for care and maintenance. Lubricate regularly in accordance with instructions. Use only good lubricants. Keep oil and grease and fittings free from dirt or grit.

Watch the little things. Anticipate troubles; don't wait until they arise. Keep machine clean so you can see trouble start.

Time is precious. Your excavator has important work to do in this war we're fighting. Make sure it is kept in tip top fighting condition by giving it the best possible care constantly.

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.

For speed.. for safety.. for long-term economy.. you can't beat

BETHLEHEM

FORGED-STEEL MINE CAR WHEELS!

★

Among thousands of Bethlehem Forged Steel Wheels in use, *not one* flange has ever broken in normal service.

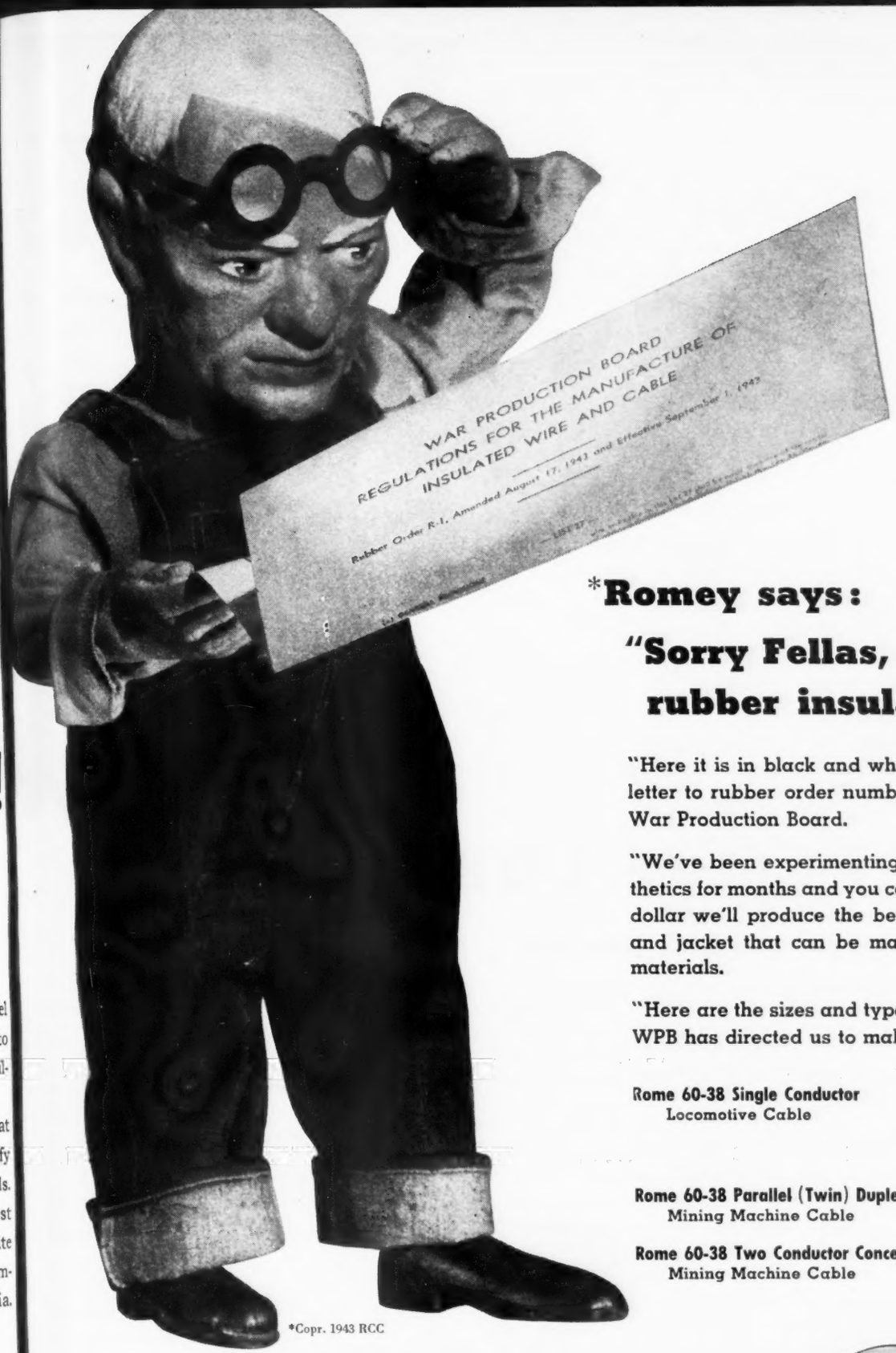
For the mine operator, there's a real dollar-and-cents message in this fact. Bethlehem Forged-Steel Wheels pay for their slightly higher cost many times over, in stubborn, dogged service. Some have been in hard use, carrying 7½-ton loads, for as long as twelve years.

Bethlehem Forged-Steel Wheels for mine car service are forged by a special process from high-quality open-hearth steel, making them tougher . . . stronger . . . more resilient. Flanges do not chip. Flat spots "iron out" in service instead of growing worse, as on ordinary wheels.

With Bethlehem Forged-Steel Wheels, renewal becomes a factor that the operator can almost forget. Haulage is speeded up—wheels are in service, where they belong, instead of being tied up in the shop. And the margin of safety is increased, for these forged-steel wheels, with their immunity to breakage, mean an end to derailments due to broken wheels.

To avoid delays . . . to get that last ounce of production . . . specify Bethlehem Forged-Steel Wheels. Get in touch with your nearest Bethlehem district office, or write direct to Bethlehem Steel Company, Bethlehem, Pennsylvania.

★ BETHLEHEM STEEL ★


WAR PRODUCTION BOARD
REGULATIONS FOR THE MANUFACTURE OF
INSULATED WIRE AND CABLE
Rubber Order R-1, Amended August 17, 1943 and Effective September 1, 1943

*Copr. 1943 RCC

*Romey says:

"Sorry Fellas, no more rubber insulation"...

"Here it is in black and white—supplemental letter to rubber order number 1 issued by the War Production Board.

"We've been experimenting with the new synthetics for months and you can bet your bottom dollar we'll produce the best cable insulation and jacket that can be made from available materials.

"Here are the sizes and types of mining cables WPB has directed us to make:—

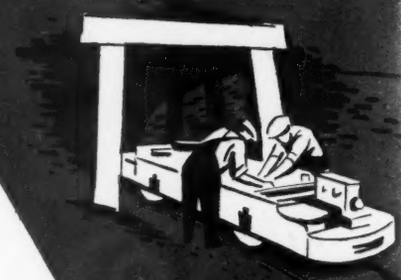
	Sizes	Stranding
Rome 60-38 Single Conductor Locomotive Cable	6	49
	4	49
	2	133
	1	133
Rome 60-38 Parallel (Twin) Duplex Mining Machine Cable	2	133
Rome 60-38 Two Conductor Concentric Mining Machine Cable	4	49
	2	133

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

ROME • NEW YORK

MEMO TO: E.K.
Here's a breakdown that was due to lack of proper information—rather than lack of attention
R.L.B.
Superintendent



TROUBLE REPORT

Haulage locomotive in No. 2 broke down at main switch back. Complete entry tied up 2 hours...cost 300 tons of coal, plus repairs and new parts. Cause—both main motors failed due to excessive lubrication of armature bearings. Excess grease was forced into motor windings.

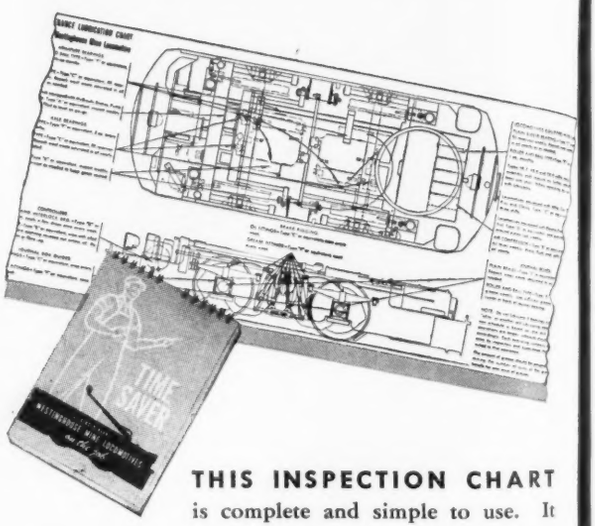
EFFECTIVE LUBRICATION

can prevent troubles like this

The case history above shows that all mine locomotive troubles are not caused by neglect or lack of attention. Insufficient knowledge of proper lubrication methods may cause a conscientious workman to create a tonnage-losing breakdown.

If the easy-to-use lubrication chart, (shown at right) is made available to every maintenance man, breakdowns like that above should not occur. This chart is contained in the Westinghouse Time Saver Guide for mine locomotives. It is complete and concise, yet extremely easy to follow.

See that each of your workmen responsible for locomotive inspection receives and uses a copy of this Time Saver Guide. It will save you many a lost time and tonnage report. J-15085



THIS INSPECTION CHART is complete and simple to use. It includes the characteristics of the lubricants recommended for various lubricating points. It is a necessary addition to any maintenance man's library.

WRITE TODAY to Dept. 7-N for copies of this book for your men. Ask for Booklet B-3150.

Westinghouse
PLANTS IN 25 CITIES ... OFFICES EVERYWHERE

WESTINGHOUSE

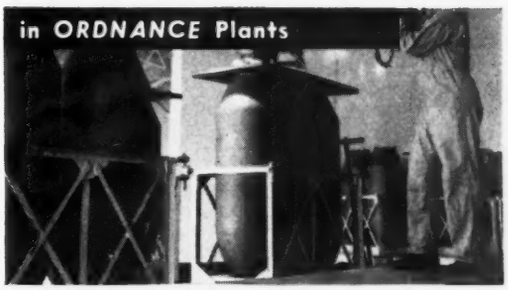
MINE LOCOMOTIVES

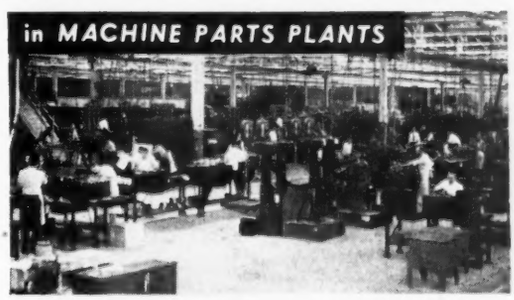
Here Are

A Few of the Industries

in which

GATES V-BELTS *of* Synthetic Rubber





-and Many Others

Have Been Tested and *Proved*

by *YEARS* of *SERVICE*

Five years before natural rubber supplies began to be curtailed, Gates was already supplying many industries with large quantities of V-Belts made entirely of synthetic rubber.

The synthetic rubber used was a very special one and was not used as merely a substitute for rubber. It was used because, in many applications, it is greatly superior to natural rubber. For example, under severe conditions of heat and oil, the Gates special synthetic V-belt actually outwears belts of natural rubber by as much as 230%.

This is the record *not* of just a *few* belts over a *short period* of time. It is the record of *thousands* upon *thousands* of Gates special synthetic rubber V-belts that have now been tested and proved by *years* of service in Aircraft Factories, in Ordnance Plants, in Steel Mills, in Machine Parts Plants, in Lumber Dry Kilns, in Food Processing Plants—in every kind of installation where heat and oil conditions are *excessively severe*.

The time has now come when Gates long and successful experience in the fabrication of synthetic rubber V-belts is particularly to your advantage because it can *now* be put to work for you *right in your own plant*.

You have only to look in your telephone directory and call the Gates Field Engineer. He will put at your service the full benefits of Gates knowledge and experience *without the slightest obligation*.

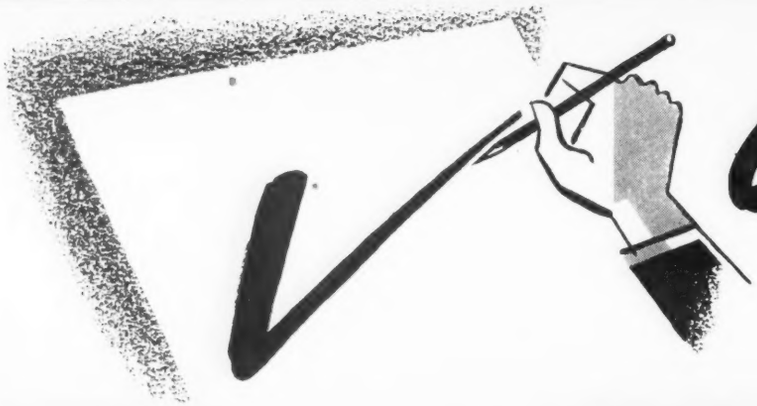
THE GATES RUBBER COMPANY

4311

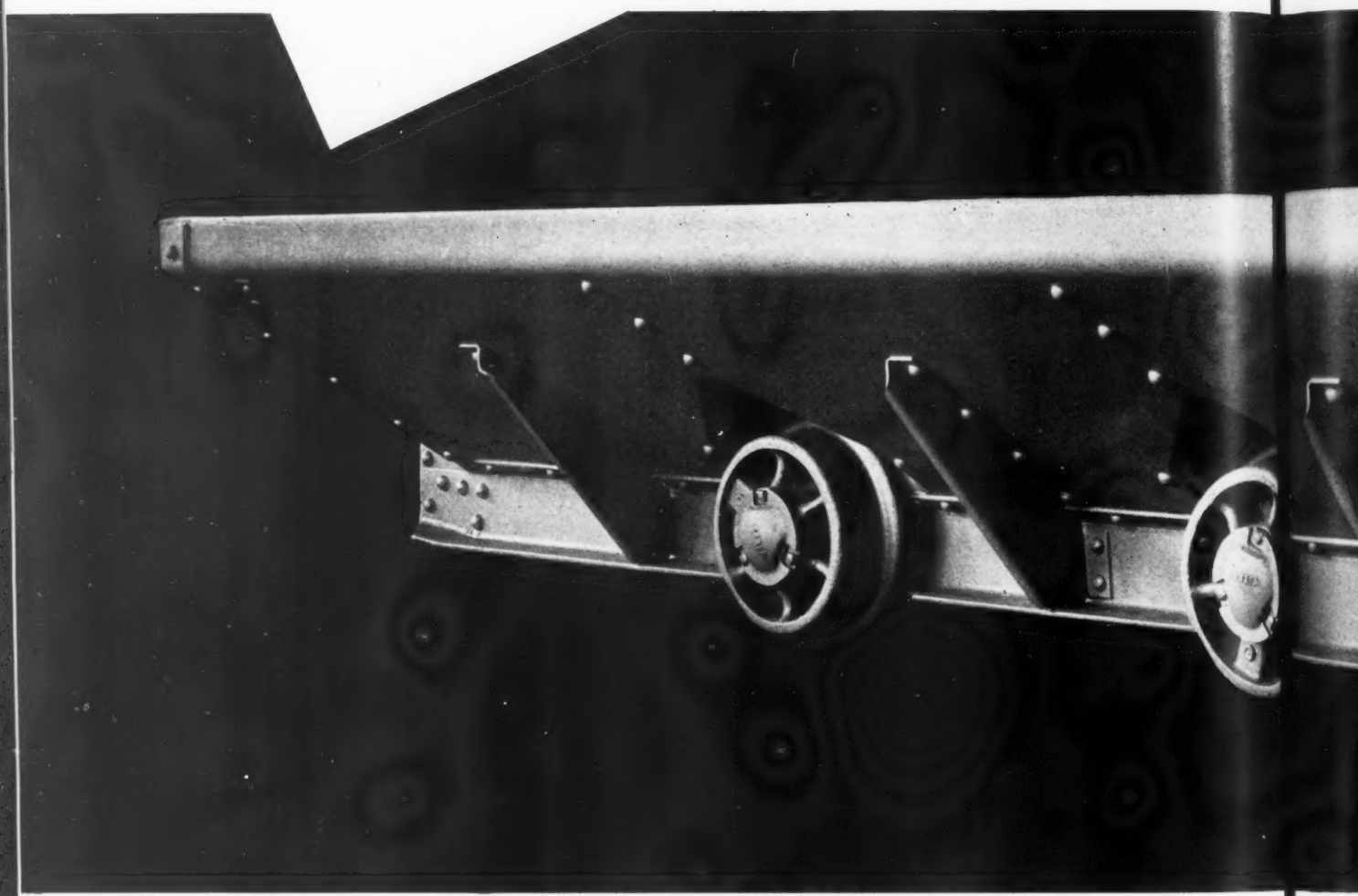
Engineering Offices and Stocks in All Large Industrial Centers

GATES VULCO ROPE DRIVES

CHICAGO, ILL. 549 West Washington
NEW YORK CITY 215-219 Fourth Avenue
ATLANTA, GA. 738 C & S National Bank Building
LOS ANGELES, CAL. 2240 East Washington Boulevard
DENVER, COLO. 999 South Broadway
DALLAS, TEXAS 2213 Griffin Street
PORTLAND, ORE. 333 N. W. 5th Avenue
SAN FRANCISCO, CAL. 1090 Bryant Street



CHECK



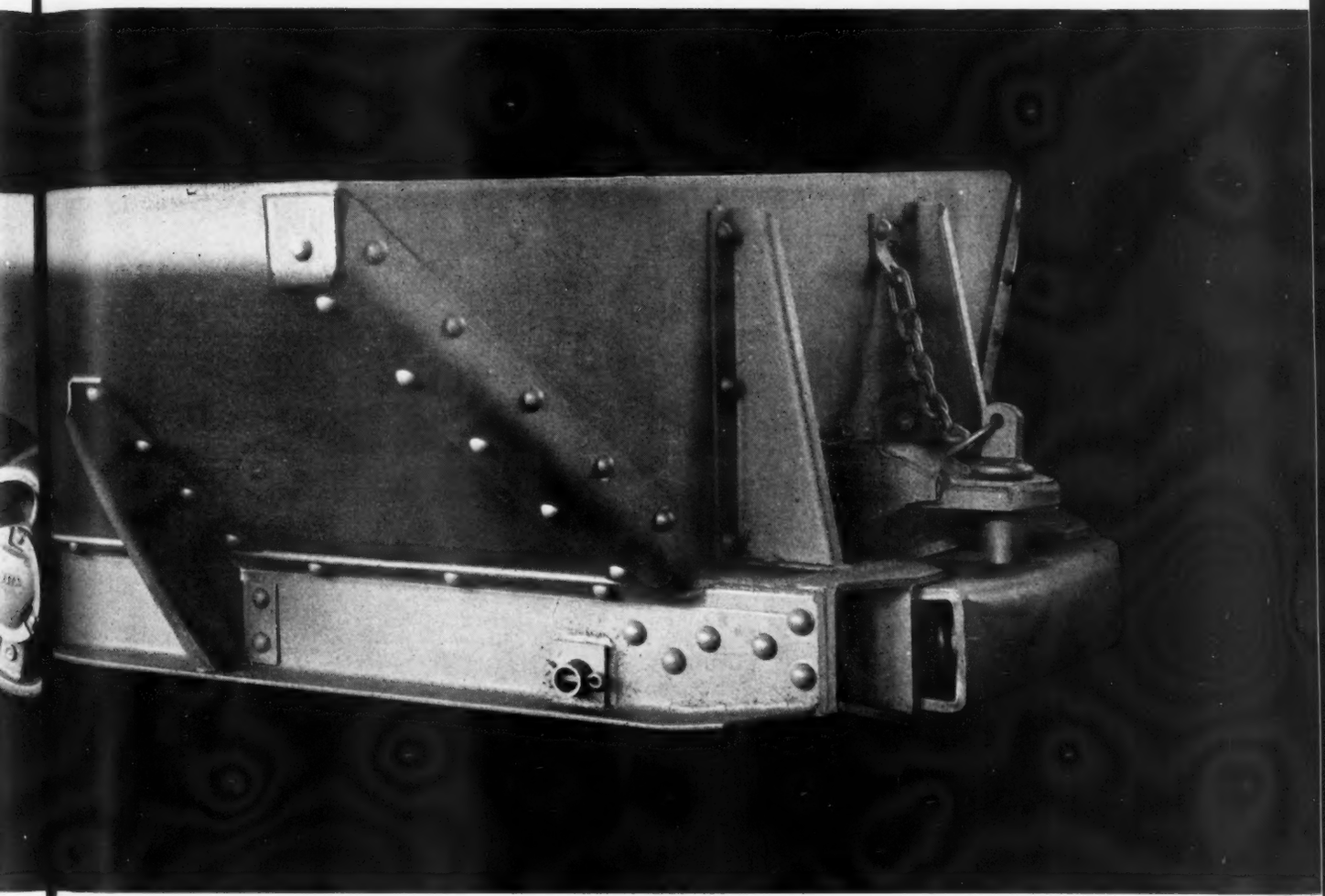
a.c.f.

AMERICAN CAR AND FOUNDRY COMPANY

NEW YORK · ST. LOUIS · CHICAGO · PHILADELPHIA · BERWICK, PA. · PITTSBURGH · CLEVELAND · HUNTINGTON, W. VA.

THE ADVANTAGES

of this A.C.F. drop-bottom car!



Here's an A.C.F. drop-bottom mine car of maximum capacity. It is most sturdily built, with ample strength to meet the demands of wartime mining operations. If you consider buying drop-bottom cars, this A.C.F. drop-bottom will give you everything you are looking for in a modern, efficient mine car.

It carries maximum loads with minimum power requirements, for its A.C.F. chilled tread wheels roll on the rails with the least possible friction. And these wheels are equipped with the most modern of anti-friction bearings.

It has electrically welded end sill construction, with built-in pancake double-acting spring bumper. This combination adds years of service life to the car.

The automatic drop-bottom doors can be depended upon to stay closed until you want them to open. The door hinges can be had 'lubricated for life'.

We will be glad to arrange to have you see these cars in actual operation. Place your order now, and we will do our best in every way to be of the greatest service to you.

WALTER
TRACTOR TRUCKS

- Increase Tonnage
- Offset Manpower Losses
- Reduce Hauling Shutdowns and Slowdowns
- Lower Hauling Costs

WHY be satisfied with two, three, even ten ton loads, when you can haul up to 50 tons per trip with Walter Tractor Trucks. Equalling the speeds of smaller trucks, they provide a tremendous increase in tonnage with fewer trucks and fewer drivers. More than this, Walter Tractor Trucks, being specially designed for off-the-road hauling, keep pit and tipple working under running conditions that would stop any other trucks.

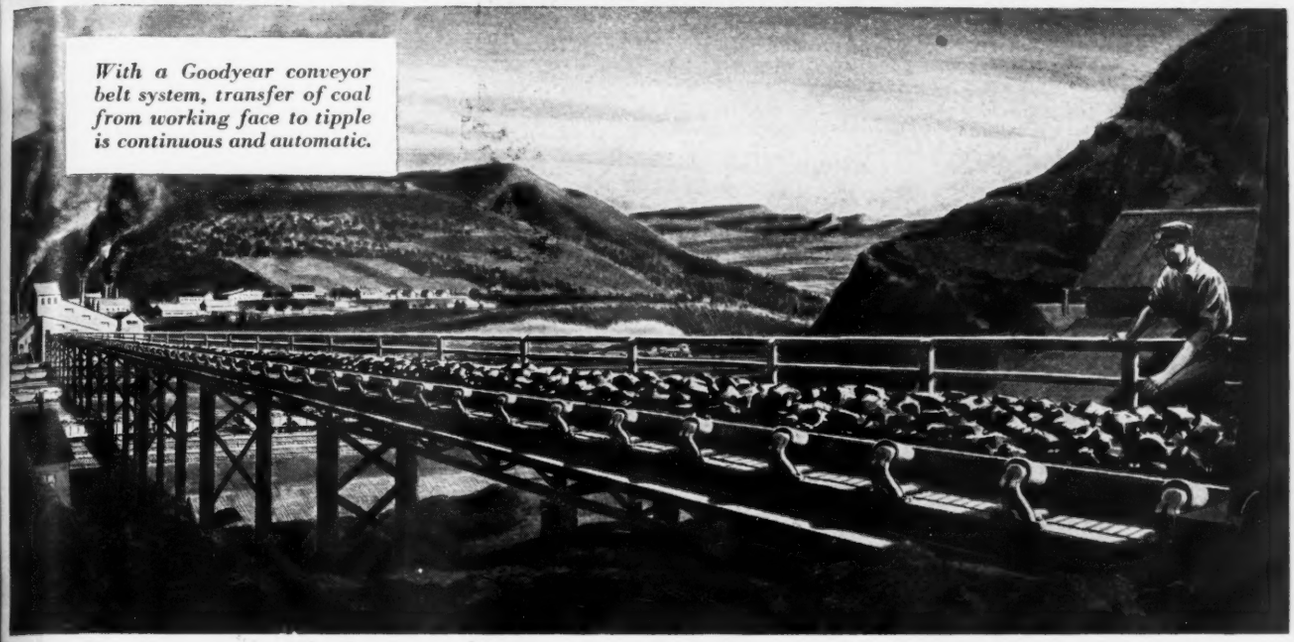
The key to the Walter Tractor Trucks' huge tonnage capacity is the traction of the exclusive Walter Four Point Positive Drive—a true four wheel drive that permits the maximum use of four driving wheels. Three patented Automatic Locking Differentials proportion the power to each wheel according to its traction at any instant, preventing wheel slippage on soft, slippery surfaces and steep grades.

The Walter Tractor Type Transmission supplies six forward and two reverse speeds, selected by a single gear lever. Higher road clearance, better tire contact, greater gear capacity are provided by the Suspended Double Reduction Drive. Short wheelbase assures easy maneuvering. These and other features are fully described in literature that is yours for the asking.

Walter

MOTOR TRUCK COMPANY

1001-19 Irving Avenue
RIDGEWOOD, QUEENS, L. I., N. Y.



With a Goodyear conveyor belt system, transfer of coal from working face to tipple is continuous and automatic.

Surest way to keep a coal mine out of the red!

• *A new era is here in bulk transportation* •

How can coal compete with other fuels without going into the red—in the face of higher mining costs?

The Goodyear conveyor belt haulage system, from working face to loading tipple, is by far the lowest-cost-per-mile transport ever developed.

Many Goodyear belt systems—some miles long—in operation in large mines for several years, show these important economies:

Continuous belt haulage works loading machines faster and more efficiently—and there's no lost time in spotting cars. No track- and switch-laying. No bonding. No heavy grading—belts operate successfully on grades up to 32 per cent. Belts require less headroom in low seams, reduce timbering and deadwork. With less breakage in transit, you get 12 to 15 per cent more lump coal.

Practically automatic operation demands only a small maintenance crew. Positive control eliminates runaway loads, lessens traffic accidents and injury claims. Lighter over-all weight of moving equipment reduces power cost.

Over half a million feet of Goodyear belting is now serving "mechanized" mines in underground service to increase vital tons-per-man-per-shaft production. Have you investigated the possibilities of mechanizing your properties?

Consult the G.T.M. — Goodyear Technical Man — on present and postwar plans. He can also advise you on Goodyear's quality line of war-grade belts, hose and other industrial goods available in either natural or synthetic rubber. Write Goodyear, Akron 16, Ohio or Los Angeles 54, California—or phone the nearest Goodyear Industrial Rubber Goods Distributor.

★ ★ ★ ★ ★ ★ ★ ★ ★
★ To Hasten Victory ★
★ BUY MORE ★
★ WAR BONDS ★
★ ★ ★ ★ ★ ★ ★ ★ ★

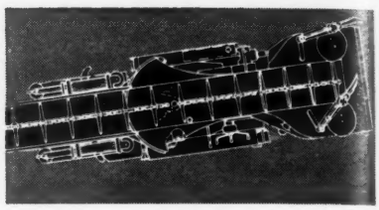
Have you tried this way to help keep loaders turning out more tonnage?

● How LONG has it been since you checked up on loader lubrication? Your loaders are taking a lot of punishment they never had before. They're operating extra shifts, handling greater tonnages, and, of necessity, probably getting less care.

Should lubricating schedules be changed to meet these new conditions? Are tougher lubricants needed to stand the higher temperatures and harder use between servicing periods? Will better methods of lubrication reduce the time that loaders are out of service?

Answers to these questions can help you keep up loader output. And a Standard Lubrication Engineer can help you answer them. From his experience in other mines, on equipment and problems just like yours, he is sure to find any possible improvements which can be made in your loader lubrication to keep equipment on the job. He has a new line of Superla Mine Loader Lubricants developed particularly for loaders under war pressure.

Test these new lubricants. Get a Standard Lubrication Engineer to help you. Just write the nearest Standard Oil Company (Indiana) office, or 910 S. Michigan Ave., Chicago 5, Illinois for the Engineer nearest you.



New Superla Mine Loader Lubricants include:

No. 3—A dripless oil for fairly tight loader gear cases; excellent for wick feed oilers on loaders and locomotive bearings.

No. 4—A fibrous type thickened oil particularly for Goodman Loader lubrication.

No. 5—A fibrous type thickened oil for gears and transmissions on Joy Loaders. Especially useful in reducing consumption.

No. 6—A fibrous type thickened oil for gear cases and gathering head pots on Joy Loaders. Can be applied with pressure gun for bearings.

No. 7—A fibrous type, soap-thickened oil for general mine lubrication underground—for loaders, shuttle car motor gear cases, and conveyor bearing lubrication.

No. 8—A smooth type, heavy thickened oil for armature bearings and makeup in cases requiring a leak-resisting lubricant.

INDOILS...Three grades of straight mineral oils for hydraulic systems.

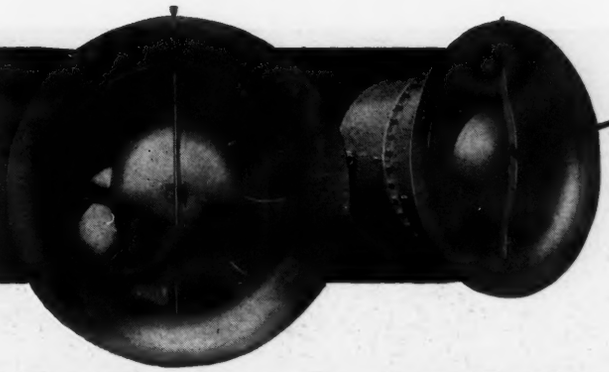
No. 41
No. 75
No. 95 } Provide a range of viscosities to meet all loader hydraulic system requirements.

Oil is ammunition...Use it wisely

STANDARD OIL COMPANY (INDIANA) STANDARD SERVICE

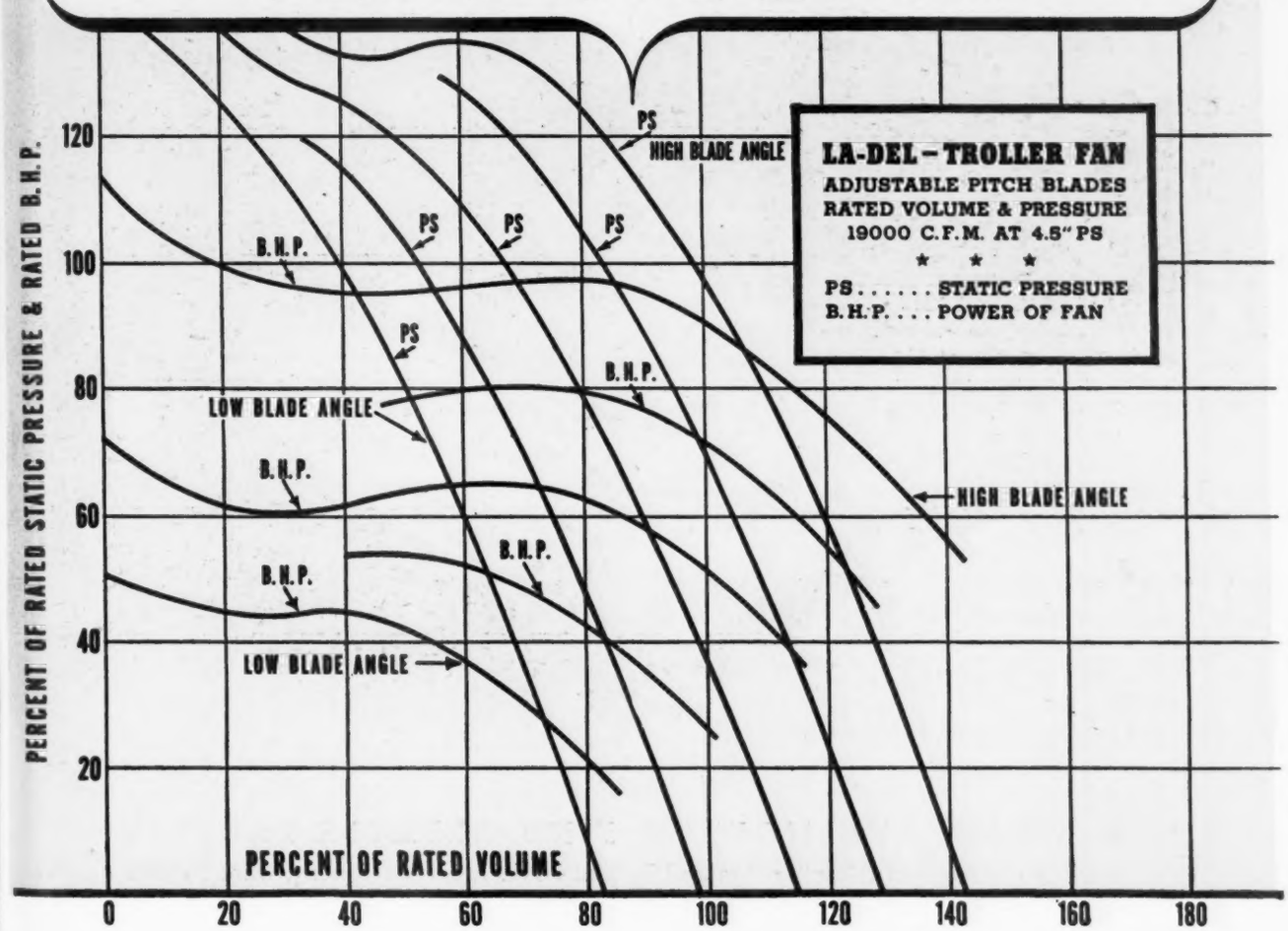
★ LUBRICATION ENGINEERING

LA-DEL *Adjustable Pitch* Design...



CONTROL FOR PITCH ADJUSTMENT OF PROPELLER BLADES

a big LA-DEL Feature that enhances all other LA-DEL Features . . . and assures this:



THERE are many points of superiority in LA-DEL Axial Flow Fans, that assure the quick, economical movement of air. Retention of these features by the adjustable pitch blade design, assures the numerous advantages of a comparatively flat power curve, without serious sacrifice of power at any of the adjusting angles.

As illustrated by the above graph, the power curve remains relatively flat at the low or the high blade angle. But in the case of the low blade angle the curve as a whole drops down to a point below that of the high blade angle, thus holding the power requirement in line with fan output.

Adjustable pitch axial flow fans were pioneered by the La-Del Conveyor and Manufacturing Co. in large sizes from 5 ft. to 11 ft. in diameter, with power requirement to as high as 1000 H. P. In such large sizes power cost is of great importance. And the flat power curve protecting the motor unit against overload is also of great importance at every blade setting. The adjustment may be manual from a point outside the air stream or may be controlled from a remote position by power.

The two advantages are combined without the sacrifice of efficiency in LA-DEL adjustable pitch fans, now available in the smaller sizes for certain essential wartime uses. In the postwar period LA-DEL Axial Flow Air Fans will be available generally to industry in all sizes.

BUY WAR BONDS TO SPEED VICTORY

LA-DEL CONVEYOR & MANUFACTURING CO.

NEW PHILADELPHIA, OHIO

ENGINEERS OF LA-DEL AIR MOVEMENT

★ PIONEERS IN THE DESIGN OF AXIAL-FLOW FANS FOR EFFICIENT AIR CIRCULATION ★

▶ **WHERE AND HOW TO FIND GREATER PROFITS** is the real subject of this attractive and helpful book. It means exactly what its title says—"How To Make our Coal Worth More."

It contains several valuable "case-histories"—interesting accounts of the methods by which leading coal producers made *their* coal *worth more.*

Also it presents a plan—a simple, practical procedure by which you can determine how much additional profit can be found in your plant.

Any coal producing executive who is interested in improving the quality of his product will find this book of real value. *We will gladly send you a copy—write for Bulletin No. 160—no charge of course.*

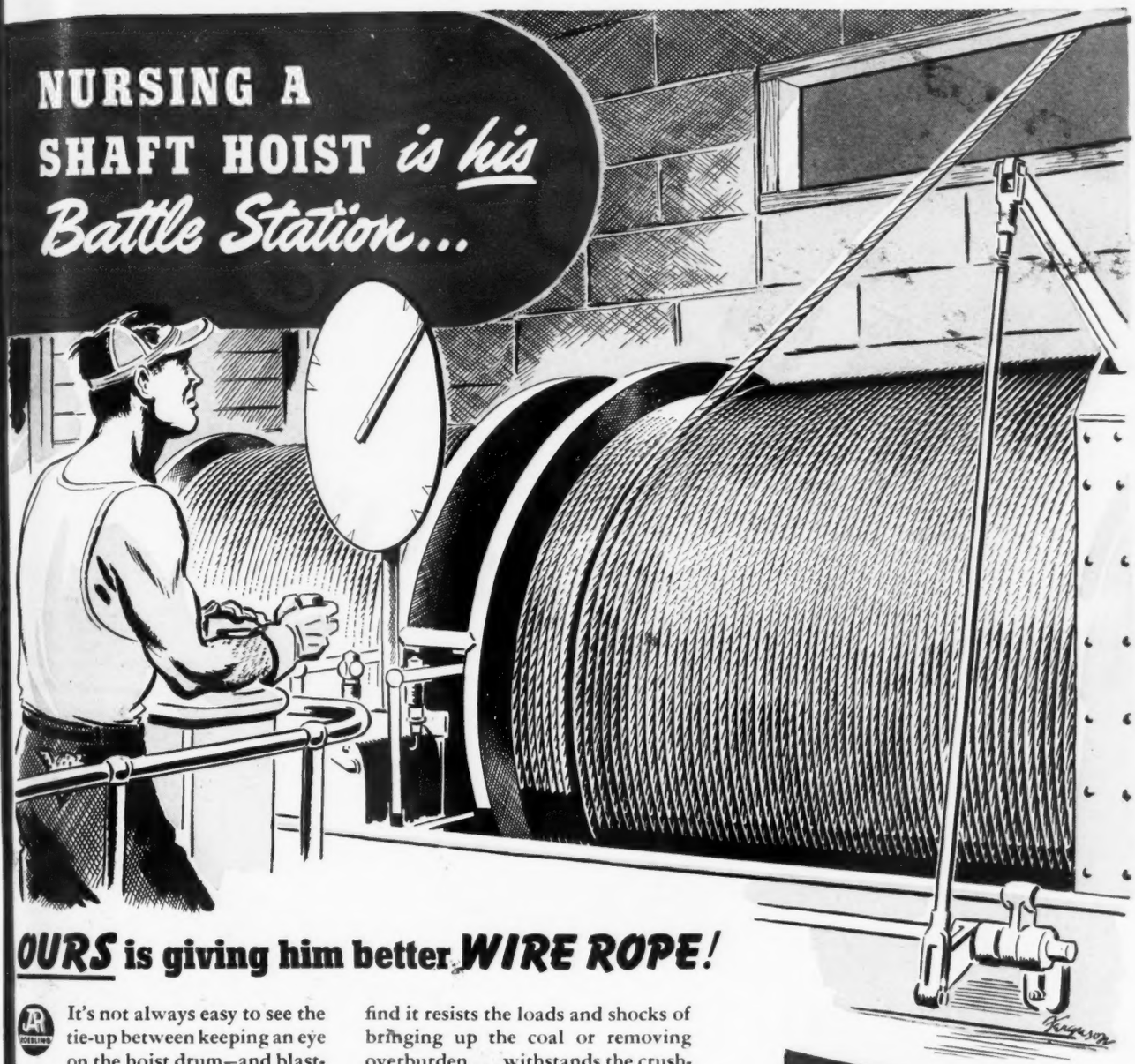
RS AND COMPANY

ROBERTS and SCHAEFER CO.

307 North Michigan Avenue, Chicago 1

P. O. Box 865, PITTSBURGH 30, PA. | 1711 Connecticut Avenue, N. W., WASHINGTON 9, D. C. | P. O. Box 570, HUNTINGTON 10, W. VA.

NURSING A SHAFT HOIST *is his Battle Station...*



OURS is giving him better *WIRE ROPE!*

It's not always easy to see the tie-up between keeping an eye on the hoist drum—and blasting the enemy. But, look at the fronts where coal is fighting and there's nothing remote about it, yours is a front line industry . . . as necessary in the nation's power plants as on the railroads that deliver the goods.

And our job of keeping you supplied with a tough, easy-to-handle wire rope like "Blue Center" is no less vital. First choice with outstanding mines throughout the country, you'll find it resists the loads and shocks of bringing up the coal or removing overburden . . . withstands the crushing and abrasion of high speed operation . . . gets full capacity from men and equipment through easier handling, fewer shutdowns, more sustained production.

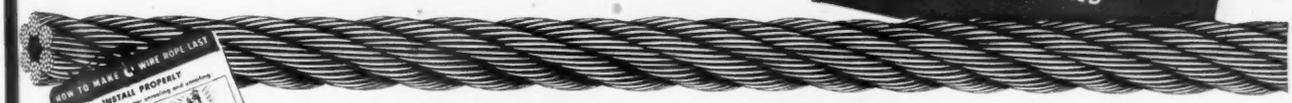
Yes, Roebling "Blue Center" Steel Wire Rope is conserving steel for all America . . . by staying on the job longer . . . by meeting emergency service conditions unfailingly, wherever wire rope has a job to do, for Victory.

ROEBLING

"Blue Center"

STEEL WIRE ROPE

PREFORMED OR NON-PREFORMED



. . . GIVE *YOUR* WIRE ROPES A *FIGHTING CHANCE!*

and they will deliver the full length of service that has been built into them. To help you, Roebling has assembled a wealth of conservation data and boiled it down on a 4x5 inch tag that can be fastened right to the equipment. Printed in two colors and varnished to stay clean, it's a convenient way to remind and instruct operating men about such vital precautions as: Proper Installation, Correct Spooling, Proper Use of Clips, Regular Lubrication, Frequent Inspection and Careful Operation. Copies are yours for the asking. Write our nearest office and specify Tag "A".

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SULLIVAN 7-AU

Sullivan 7-AU licensed under patents to E. C. Morgan, patents number 170691—170692—1707132—1953325—1953326.

PRODUCTS

Coal Mining Machines • Scraper Haulers • Rock Loaders • Hoists • Car Pullers • Air Compressors • Coal Drills • Rock Drills • Cutter Bit Sharpeners and Heaters Core Drills and Core Drill Contracting

TRACK CUTTER

- 2 CUTS WITH ONE LAYING OF TRACK.
- CUTS AND SHEARS ROOM NECKS WITHOUT THE LAYING OF TURNOUT SWITCHES.
- CUTS OVER LARGE AMOUNTS OF BROKEN-DOWN DRAW SLATE.
- HORIZONTAL CUTTING RANGE 41 FEET 1 INCH.
- SHEARS PARALLEL CUTS 21 FEET 8 INCHES APART.
- CUTTING HEIGHT FROM 10 INCHES BELOW RAIL TO 8 FEET 6 INCHES ABOVE.

And the Simplest Construction of All

SULLIVAN

MODERN MACHINES FOR EVERY MINING METHOD

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Grantham Lincs, England

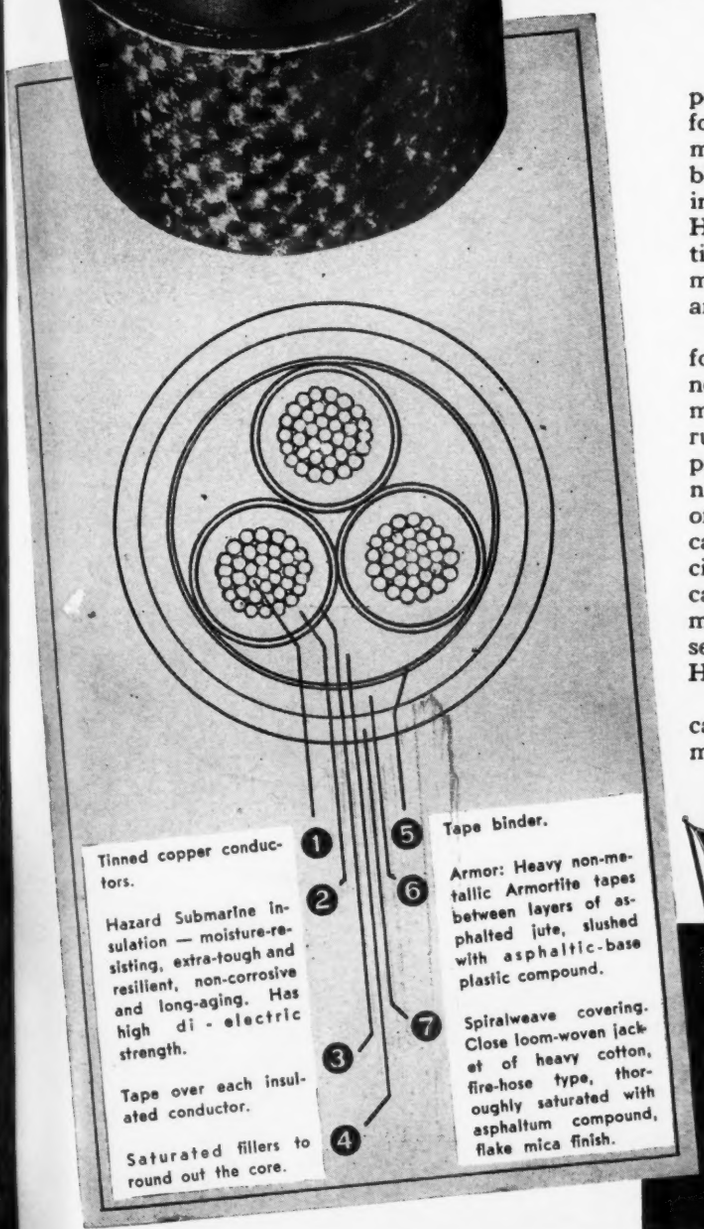
BLOCKBUSTER

Yes, blockbusters would break-up frozen coal. But the railroads wouldn't like to have their cars wrecked. They don't like to have bonfires built under cars, *nor to have cars bumped hard,* nor mined out with pick and shovel. So railroad men don't like frozen coal. ¶ Dealers don't like frozen coal either. They pay the demurrage. They do the pick and shovel work. When they get frozen coal unloaded, it usually isn't the grade it started out to be and they lose money. ¶ Just a few pounds of calcium chloride, applied at the tipple will freeze proof the coal . . . do away with need for blockbusters or a second mining out of the car. Dealers can save demurrage and keep war important transport moving by ordering their coal freeze-proofed at the mines. Bulletin 37 tells how it is done. Write for it now. Calcium Chloride Association, 4145 Penobscot Building, Detroit 26, Michigan.

Today's Capacity Production Requires Electrical Power

GET IT *Safely* AND *Surely* with

ARMORTITE
MINE POWER CABLES


1 Tinned copper conductors.
2 Hazard Submarine insulation — moisture-resisting, extra-tough and resilient, non-corrosive and long-aging. Has high di-electric strength.
3 Tape over each insulated conductor.
4 Saturated fillers to round out the core.
5 Tape binder.
6 Armor: Heavy non-metallic Armortite tapes between layers of asphalted jute, slushed with asphaltic-base plastic compound.
7 Spiralweave covering. Close loom-woven jacket of heavy cotton, fire-hose type, thoroughly saturated with asphaltum compound, flake mica finish.

To attain capacity production, electrical power supply must be constant and reliable. Therefore, the cables through which this power is transmitted must also be reliable and safe. They must be designed for hard mining service and conditions in order to give a long life of efficient service. Hazard engineers constantly study mining conditions and were the originators of custom-built mining cables that are today recognized as standard in the industry.

For example, Hazard Armortite Power Cable, for inside power transmission and distribution; is a non-metallic armored, moisture-proof cable which may be laid directly in a trench without conduit, run through a pipe, or hung on messenger or supports inside the mine. Having neither lead sheath nor steel armor wires, it is about half the weight of steel armored cable and is easy to handle. Because of the non-metallic armor, there is no short-circuiting of the power conductors on the armor in case of a severe fall of rock or other material. In more than fifteen years there has never been a service failure caused by faulty manufacture in Hazard Armortite cable!

Consult Hazard engineers as to what type of cable to select for a specific application to assure maximum efficiency and life.

HAZARD INSULATED WIRE WORKS

ARMY E NAVY

DIVISION OF THE OKONITE COMPANY

Works: Wilkes-Barre, Pa

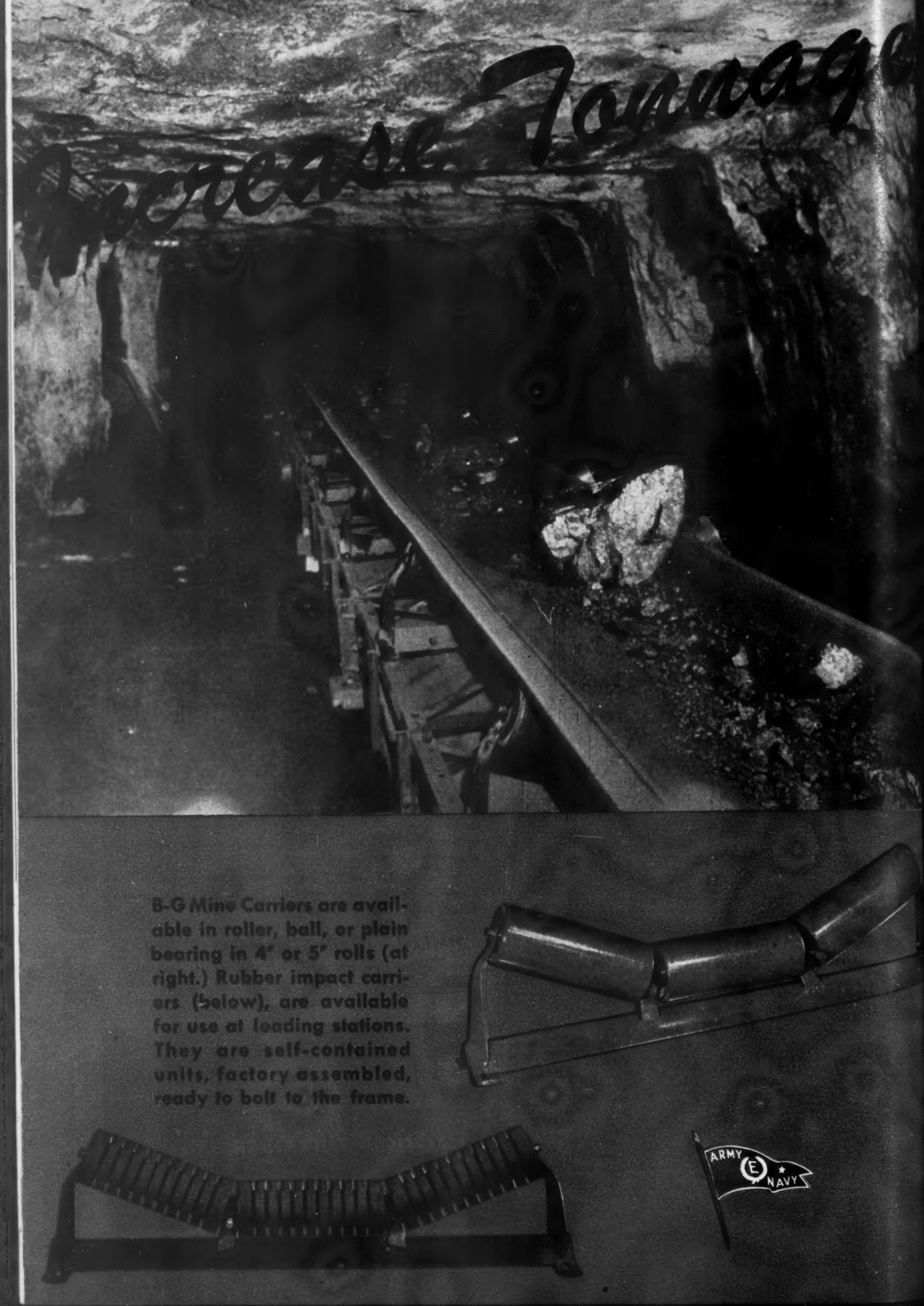
Offices in Principal Cities

3261

HAZARD

Electrical Wires and Cables For Every Mining Use

Salvage Your Scrap—Buy U. S. War Bonds

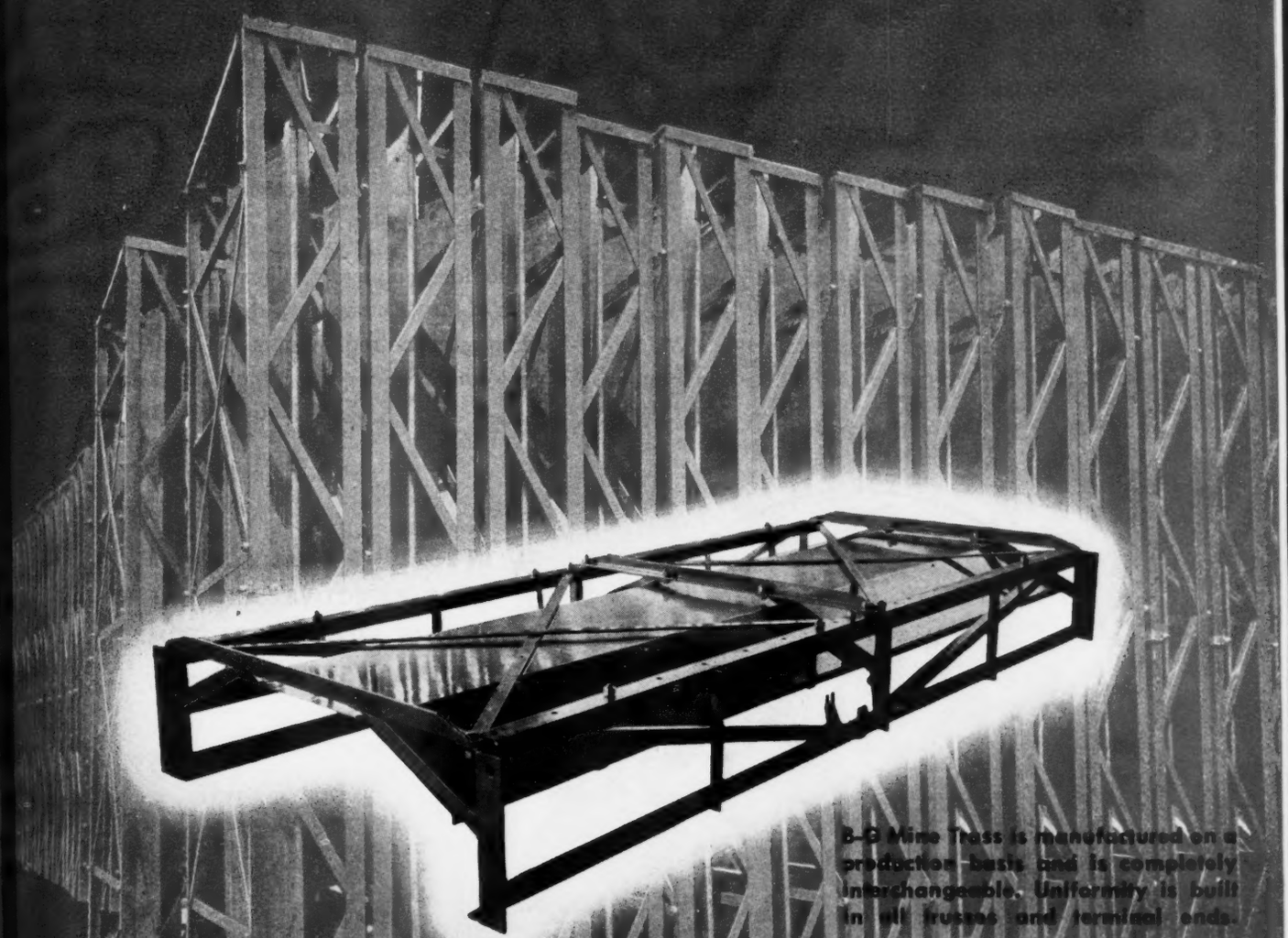


B-G Mine Carriers are available in roller, ball, or plain bearing in 4" or 5" rolls (at right.) Rubber impact carriers (below), are available for use at loading stations. They are self-contained units, factory assembled, ready to bolt to the frame.

...with BARBER-GREENE Standard Mine Conveyors

Tonnage goes up and operating costs go down with B-G truss-type mine conveyors. Designed for underground use, it is based on principles proved by years of outstanding operation above the ground. Long life through heavy duty construction, unusual rigidity, and accurate alignment are assured. Panels and main line belts can be made up as needed and lengthened as the workings advance. Write for additional information.

BARBER-GREENE CO. • AURORA, ILL., U. S. A.

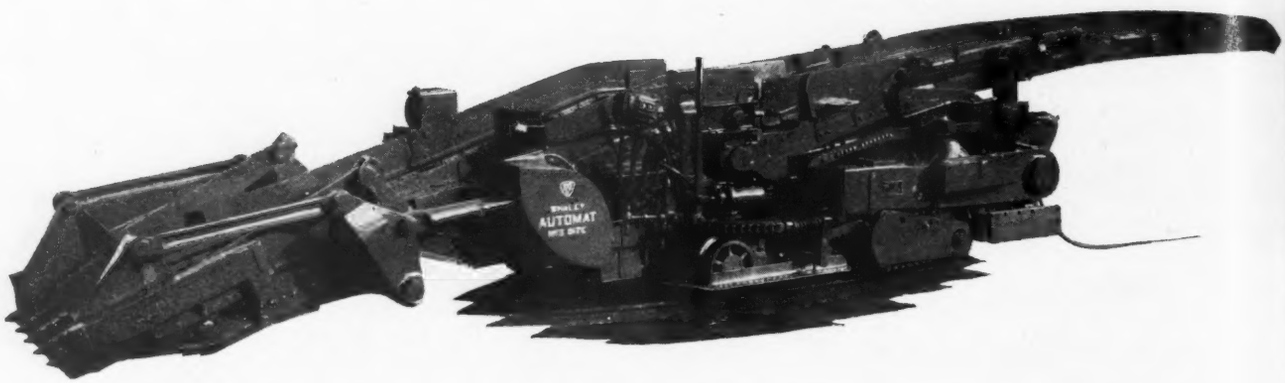


B-G Mine Truss is manufactured on a production basis and is completely interchangeable. Uniformity is built in all trusses and terminal ends.

BARBER-GREENE

BUY WAR BONDS — NOW!

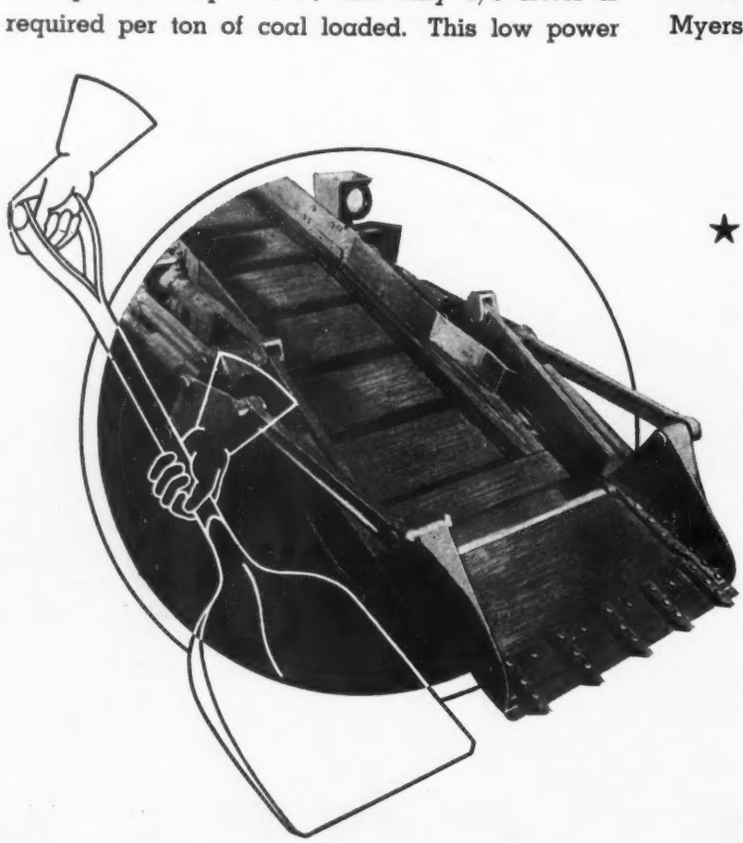
Plan Now For Your Loading Machine Requirements For 1944



★ Anticipating your requirements for equipment in 1944 is a matter to decide now. If Loading Machines are on your list, investigate the exclusive advantages offered you in the Whaley "Automat".

Whaley "Automat" loading machines are vital to essential increased production of coal and conservation of manpower. But that isn't all. While helping you to a big war job, the "Automat" will hold power consumption costs to the lowest point you've ever experienced because only one 25 H.P. motor is required to operate it, and only 1/5 KWH is required per ton of coal loaded. This low power consumption is due to the smooth but powerful shoveling action of the "Automat". This shoveling action accounts also for minimum breakage of coal . . . no dragging or crushing of coal in its operation. Furthermore, this shoveling action means safety to men. No sudden side kicking or jerking to knock out timbers, because the "Automat" shovel movement is always vertical.

Write for completely illustrated matter and full details of the "Automat". Advise us now what your loading machine requirements will be through 1944. Myers-Whaley Company, Knoxville, Tennessee.



★ **IN LOADING COAL . . . THE SIMPLEST, MOST EFFECTIVE, AND SAFEST ACTION IS WITH AN "AUTOMAT" MECHANICAL SHOVEL.**

MYERS-WHALEY CO.

Only on "AUTOMAT" Shovels

Mechanical Loaders Exclusively for over 35 years

CARDOX

"THE NON-EXPLOSIVE MINING METHOD"

MAKES IT EASIER TO MEET

WARTIME TONNAGE NEEDS WITH AVAILABLE FACILITIES!

★ ★ ★ CARDOX helps answer the battle cry for tonnage . . . often with substantial reductions in tonnage cost. It accomplishes these results by making possible more efficient use of available men and equipment. For example, coal can be broken down just as fast as falls can be loaded, because CARDOX produces no smoke or fumes. Longer cutter bars can be used when the fall is broken down with CARDOX . . . providing more coal per face for the loader. Loading is faster . . . with less wear and tear on mechanical loaders . . . because CARDOX rolls out the coal for easier handling. Coarse sizes produced by the gentle heaving action of CARDOX make it possible to remove slate and bony bands right at the face . . . making it unnecessary to haul such waste materials to the surface.

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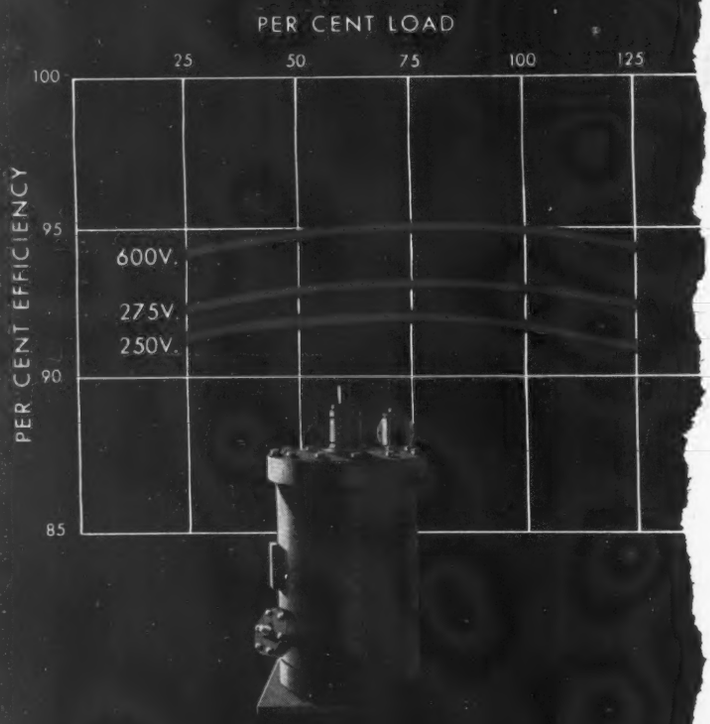
peak loads... light loads... 24-hour loads



This chart shows that the Ignitron Rectifier maintains its high efficiency over the entire load range . . . a fact which offers decided advantages in many applications.

For highly fluctuating loads, Ignitron Rectifiers offer decided advantages in power conversion. Here's why:

1. The Ignitron can operate at full capacity 24 hours a day, maintaining uniformly high efficiency.

2. It can handle high load swings easily, making it adaptable to widely diversified service conditions.

3. Efficiency at light loads is considerably higher than by other conversion methods, contributing to economy of operation.

Ignitron operating costs are low. Simplified control, low arc drop loss, the elimination of high starting demand and absence of major moving parts hold both operating and maintenance costs to a minimum.

Installation is easy, too. No special foundations are required. An Ignitron can be installed on any level floor of reasonable strength.

Investigate the advantages of the Ignitron for your particular d-c power requirements. Your nearest Westinghouse office can give you full information. Westinghouse Electric & Mfg. Co., E. Pittsburgh, Pa.

In the mining industry

In addition to its inherent advantages of high efficiency, low operating costs and high overload capacity, the Ignitron Rectifier is ideally suited to mining service.

Small, compact Ignitron substations are particularly adaptable to wheel mounting. This permits the equipment to be moved readily to follow the load center.

For complete information about the Ignitron Rectifier, write Dept. 7-N for a copy of Book B-3024.

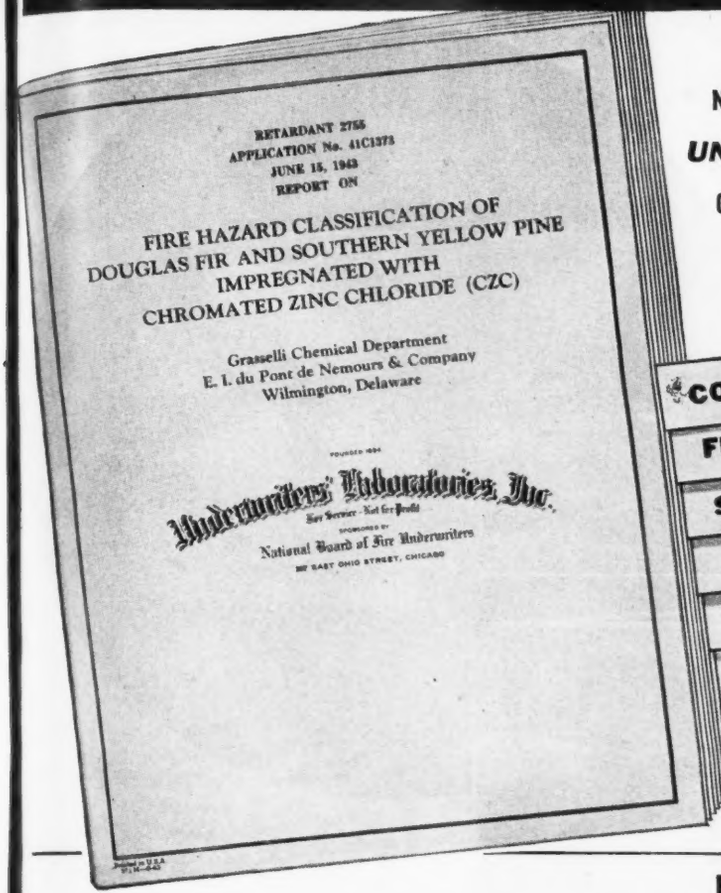
J-10252-3

Westinghouse *Electronics at Work*

IGNITRON RECTIFIERS

PLANTS IN 25 CITIES
OFFICES EVERYWHERE

Now you can get all the facts on the FIRE-RESISTANCE OF "CZC"-TREATED WOOD



NEW AUTHORITATIVE 64-PAGE REPORT ISSUED BY ***UNDERWRITERS' LABORATORIES, INC.,*** GIVES DETAILED ANSWERS TO THESE QUESTIONS ABOUT "CZC"-TREATED WOOD:

- COMBUSTIBILITY
- FIRE RETARDANT RATINGS
- SPREAD OF FIRE
- FUEL CONTRIBUTED
- DENSITY OF SMOKE
- TOXICITY OF FUMES
- DEGREE OF PERMANENCE

This chart shows the rating applied to varying amounts of "CZC" in treated wood. Untreated wood is rated 100. Incombustible asbestos-cement board is rated 0.

FIRE HAZARD CLASSIFICATION

Factors	Retention of Dry Salts Per Cu. Ft.			
	1 lb.	2 lbs.	3 lbs.	4 lbs.
Flame spread	60	40	35	30
Fuel contributed	50	35	30	25
Smoke developed	Less than with untreated lumber.			

• This report gives you distinctly useful information—new facts valuable in designing construction projects. Send for your copy today. E. I. du Pont de Nemours & Co. (Inc.), Grasselli Chemicals Department, Wilmington, Delaware.

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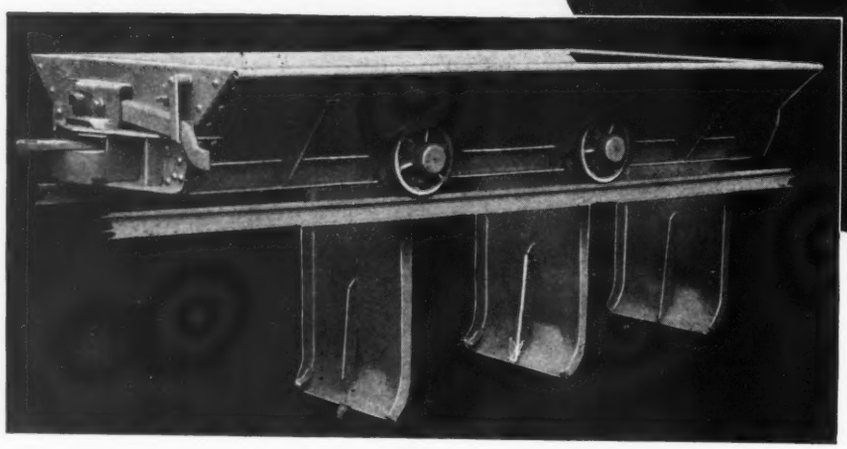
Now S-D "Automatics" May Be Unlatched ELECTRICALLY—

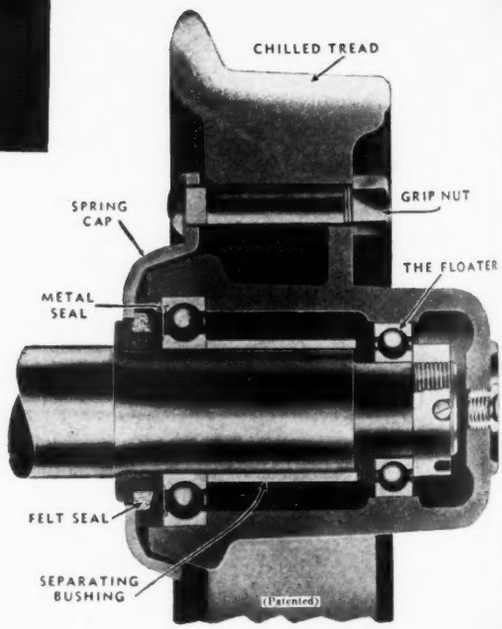
★ Sanford-Day has been recognized for years as the leader in their field because they always keep ahead of the parade with worthwhile improvements for the production of coal. One of our latest developments is the S-D Electrical Door Unlatching Mechanism.

These pictures tell the story. Shown at right is a picture of the latch-end of an S-D "Automatic" mine car which has our new, automatic, electrically operated, unlatching device. This car has no latch lever and nothing projecting beyond car. It is the last word in streamlining the method of discharging cars, and its operation is extremely simple. Below we show a car with the regular unlatching mechanism for dropping doors. This new electric device represents another Sanford-Day accomplishment, for which we continually strive to more and more reduce the cost of coal production. And every time you purchase S-D mine cars you will find in them some new improvement in design or method which reduces the cost of producing coal.



● When the car equipped with the electric unlatching device arrives at the dumping bin, contact is made simply and safely and in such fashion as to complete an electric circuit which actuates the solenoid and causes the doors to be released for falling. The doors are released instantly and they discharge the coal in the usual 1-2-3 "Automatic" manner. Doors close in the usual way also. The electric power comes from the same source as that which supplies the power for operating other mine equipment.

With S-D 1-2-3 "Automatics" . . . with this new foolproof type of unlatching device . . . with the S-D "Floater" Ball Bearing Wheel, we offer you the most modern and, definitely, the greatest money saving cars available. Let one of our representatives give you complete details of this equipment. Drop us a line now!



Sanford-Day Iron Works, KNOXVILLE, TENNESSEE

HAZARD LAY·SET *Preformed* REWARDS YOU BY—

One of these invariably justifies its specification

1. LASTING LONGER
2. BEING SAFER TO HANDLE
3. SPOOLING BETTER
4. BEING FASTER TO INSTALL
5. REFUSING TO "PORCUPINE"
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Look closely at this discarded Hazard **LAY-SET** Preformed wire rope. See any protruding wires?... No—not one of those broken crown wires leaves its assigned place. They remain flat and in place *because they are preformed.* • This means safer, faster, surer handling by workmen. No vicious barbs that may cause blood-poisoning and compensation claims. Hazard **LAY-SET** Preformed instills confidence in your men; fewer time-out accidents; steadier production. • It also means longer rope service and fewer needless damages to your equipment. Specify Hazard **LAY-SET** Preformed for your next rope. It gives you greater dollar value.

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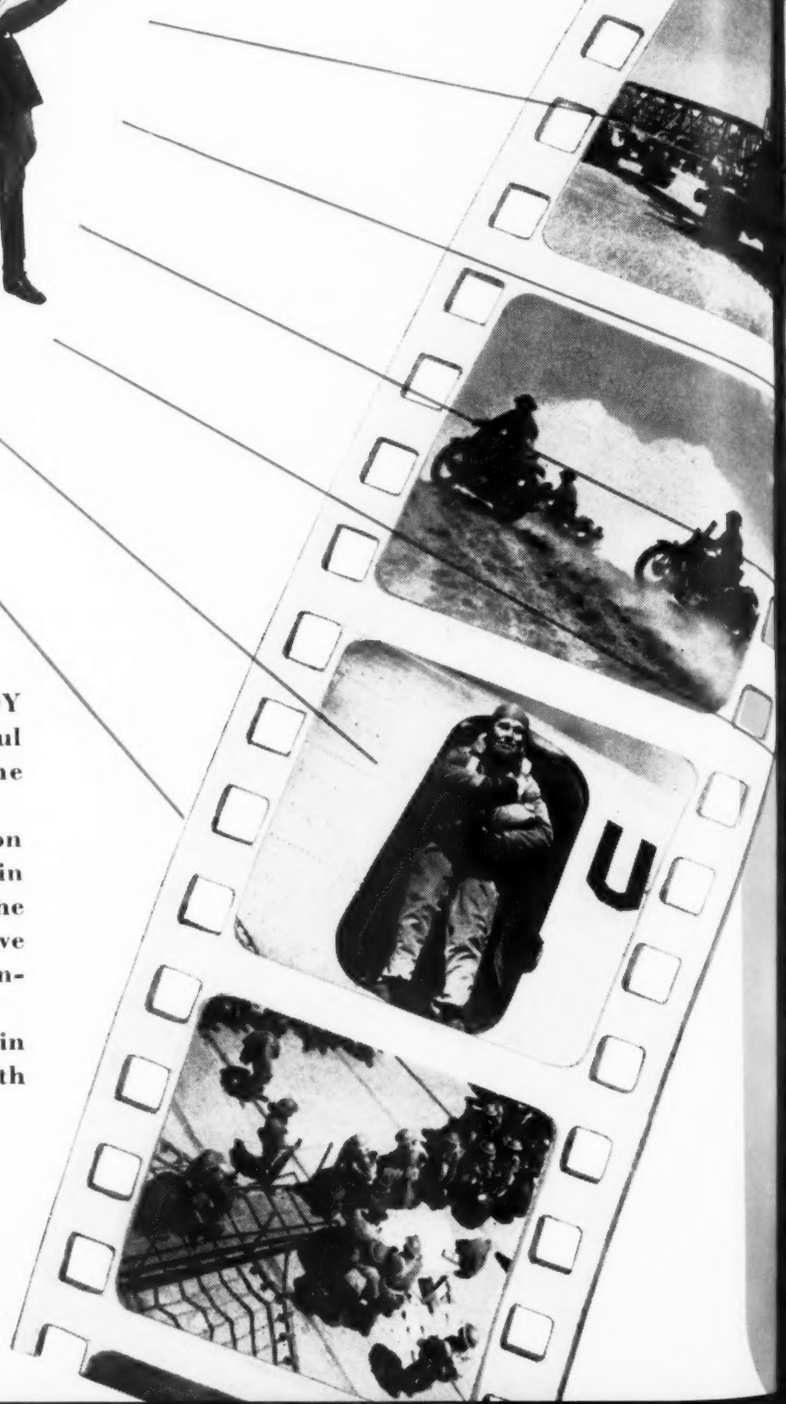
GREEN SIGNIFIES SAFETY

HAZARD LAY·SET *Preformed* WIRE ROPE

Mechanization will win the war



Mechanization is no longer a dream word—JOY made it into a mighty force, a new powerful force, in the mining and production of the nation's coal—

The whole theory of modern war is based on mechanization—skill in strategy, and courage in battle are, of course, prime essentials—but the tools of war are machines—machines that move and kill and destroy. The proved theory of industry—becomes the proved theory of Mars.

JOY Engineers, men with sound experience in the coal industry, will be glad to counsel with you.

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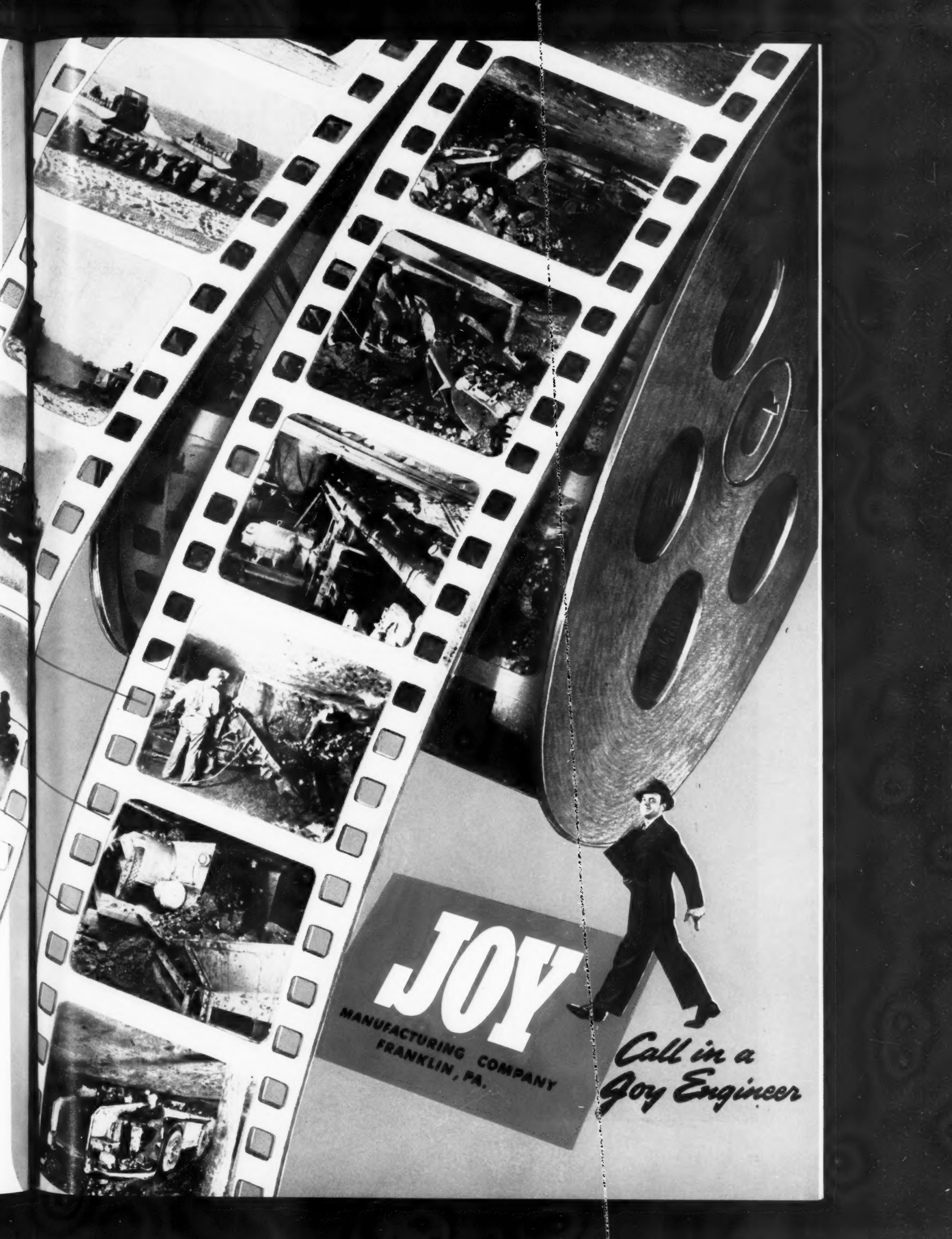
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You scuttled a Nazi Ship of *Hate*

MEN of Denmark, they never knew you . . . the iron in Danish hearts. Your native spirit flourished under Nazi-imposed "self-rule." Then you struck . . . a vital blow for the rebirth of a free Europe.

You felt the lash of the furious, baffled tyrant . . . but you hastened the day of Allied victory.

Your reward will come. As fast as your Allies can reinforce your blazing courage with planes and tanks and munitions and men . . . with great, victorious armaments that have their birth deep in pit, mine and quarry, where rugged men, using Ensign-Bickford Safety Fuse and Primacord-Bickford Detonating Fuse, make explosives produce amazing quantities of war-destined materials.

Yes, mining and mining men will speed *your day*—for *Victory Begins Underground!*

THE ENSIGN-BICKFORD CO.
SIMSBURY, CONNECTICUT

Coal Age

DEVOTED TO THE OPERATING, TECHNICAL AND BUSINESS PROBLEMS OF THE COAL-MINING INDUSTRY

November, 1943

Still No Answer

SEIZURE NO. 2 smacks of a bad movie back for a second run. Worse, it shows that the New Deal still has nothing to offer in the field of labor relations but rabbit-out-of-the-hat stunts which penalize the innocent parties and leave the real culprits free of anything more than some slight inconvenience. And, at the time this was written, it still remained to be demonstrated that seizure is or will be the answer to the real difficulty in maximum production of coal to fuel the war effort.

As in Seizure No. 1, the fact that the operators have from the start cooperated in letter and spirit with the government's wartime stabilization measures, asking only that the proper authorities decide the matters at issue, has been disregarded in the administration's attempt to squirm its way out of an embarrassing situation with at least the appearance of a victory in the eyes of the general public. Disregarded also was the operators' sincere and oft-demonstrated dedication to the job of getting out the coal—all the coal—needed for the war effort—an example which others could have followed with profit. Instead, the operators have been repaid with seizure and all its inherent threats of disruption of orderly production up to and including nationalization.

The operators, however, can take pride in their fight for production. It was and is a good fight and it will be continued. But with its No. 1 job of winning the war, the industry now faces a new fight—a fight against political philosophies and practices which make possible the situations which result in seizure. It will be no easy fight but it must be made if employers, employees and the people of the United States are to attain their true objectives of cooperation for the mutual good of all.

Real Bargains

WHAT DOES RESEARCH offer coal? And what, also, does a thorough-going public-relations program mean to coal mining now and in the future, especially in the light of Seizure No. 2? The answer is money—dollars and cents—through steadily expanding markets, increasing ability to meet competition and public confidence in the industry, its policies and its product.

What about research prospects? Some idea can be gained from a few of the investigations into such subjects as new automatic burners offering all the conveniences of competitive fuels, new stoves and furnaces providing efficiency and smokeless combustion, year-round air conditioning with coal, liquid and colloidal fuels; complete conversion of coal to gas, coal as a raw material for plastics and other synthetics and chemicals; locomotive improvements for retention and extension of the railway business, extension of pulverized-coal firing to new fields, preparation improvements, including dust-proofing, etc., etc. They all add up to new business and a many-fold return on the investment in research work and facilities.

These new developments, of course, stand on their own feet. But public confidence and regard will speed their adoption—sufficient reason, if there were no others, for supporting current public-relations programs. Other reasons, however, are plentiful. No small one is promoting public understanding—one of the best and perhaps the only method of preventing a repetition of the painful situation now confronting coal and threatening serious damage to the war effort.

For a quarter or a half cent a ton, both research and public relations are Grade A bargains.

Two-Way Help

WAR MEANS CASUALTIES and disabilities—some serious and some not so serious, although rendering a man unfit to meet the rigid standards of military service. Discharges for disability already are occurring in some numbers and the rate will increase as we put increased pressure behind our fight for freedom. The nation has the duty of providing work commensurate with their abilities to all those veterans able to work. They want work and work is what they need. And they have a lot to offer, many being able to carry a full production schedule day after day although unsuitable for military service. Coal mining certainly has jobs for some of these men and by hiring them can accomplish two highly important objectives: building up depleted working forces and repaying in part the country's debt to the men who have fought its battles.

The Truth About th

The coal mines were seized a second time on Nov. 1. This seizure, and the stoppages which accompanied it, changed a possible into a probable production crisis. It left to be solved the steadily growing problems of manpower and declining productivity. In the following pages, Coal Age outlines the implications of Seizure No. 2 and analyzes the production situation and its possible remedies. The big one is selling the miner on the war.

SEIZURE NO. 2 in coal mining became a reality Nov. 1, bringing with it a crisis in production to add to the crisis in labor and government which came into being when John L. Lewis set April 30 as the first of his time limits on the people of the United States.

Why should seizure again have become necessary? Because, as in Seizure No. 1, Lewis put power for himself ahead of the war effort. Because, to go even farther back, the New Deal, through class politics, put Lewis and other labor leaders into positions of power, relieved them of responsibility and encouraged them in forays against other elements of society. Because the New Deal, even after it fell out with Lewis and made him a mortal enemy, still persisted in its original course, covering up its lack of a sound labor-relations policy with expedients and grandstand plays.

Seizure was the inevitable result, even though it remains to be demonstrated that it accomplishes the ostensible objection and despite the fact that it penalizes the innocent parties—in this case the coal operators, whose sole objective throughout has been to get out the coal.

That is the truth about the coal crisis—a crisis that need never have existed except for boondoggling and special privilege in the field of labor. Despite advertising to the contrary, no real coal shortage existed before the War Labor Board, in rejecting the Illinois agreement, offered a compromise which Lewis, in an amazing mathematical feat, declared to be a wage cut and, so declaring, let the wheels of production grind to a stop Nov. 1.

Coal was being mined at a rate assuring capacity war production and warm American homes this winter without coupons. But previous stoppages had left a very thin margin—a margin that could be preserved only if there were no halt in production or other burdens on output. Even with that eventually, 1944 was promising growing difficulties as a result of heavier demands, loss of manpower and declining individual productivity.

Lewis' bid for power and New Deal fumbling and refusal to face the consequences of its labor policy—or lack of policy—have moved that production crisis much nearer—so near that coupon rationing and curtailment of industrial supplies became an immediate possibility rather than a contingency to be planned for just in case. Stocks above ground might take up a little of the slack and thus stave off some restrictions, although reducing the country's safety margin. But anthracite stocks are practically nil; likewise, stocks of metallurgical and other special-purpose coal. So stocks are not the whole answer to a decline in output.

What is the present situation? The administration, again noisily locking the stable door after the equine quadruped had fled, has seized the mines a second time. This seizure followed the pattern of the first. No conference

SEIZURE NO. 2

1. Effective Nov. 1, 1943, until no longer necessary for furtherance of the war effort but in no event more than 60 days after the restoration of the productive efficiency of the mines.

2. Secretary of the Interior Ickes designated to take possession of and operate the mines.

3. Management permitted "to continue its managerial functions to the maximum degree possible."

4. Secretary Ickes authorized to request protection for men who return to work from the Secretary of War, if necessary.

5. Secretary Ickes authorized to offer miners a contract or contracts for the period of government operation based on the War Labor Board opinion of Oct. 26 in the matter of the Illinois agreement, such contract or contracts to be subject to WLB approval.

the Coal Crisis

was called and no attempt was made by Roosevelt, the one man who conceivably could break the deadlock, to seek a settlement without resort to such drastic action as seizure, with its threat of nationalization. Instead there was the promise of "decisive action," the nominal period of grace—with no opportunity for the operators to voice an opinion or make suggestions—and the final dropping of the ax, ostensibly on the neck of the real culprit but in reality on the necks of the operators.

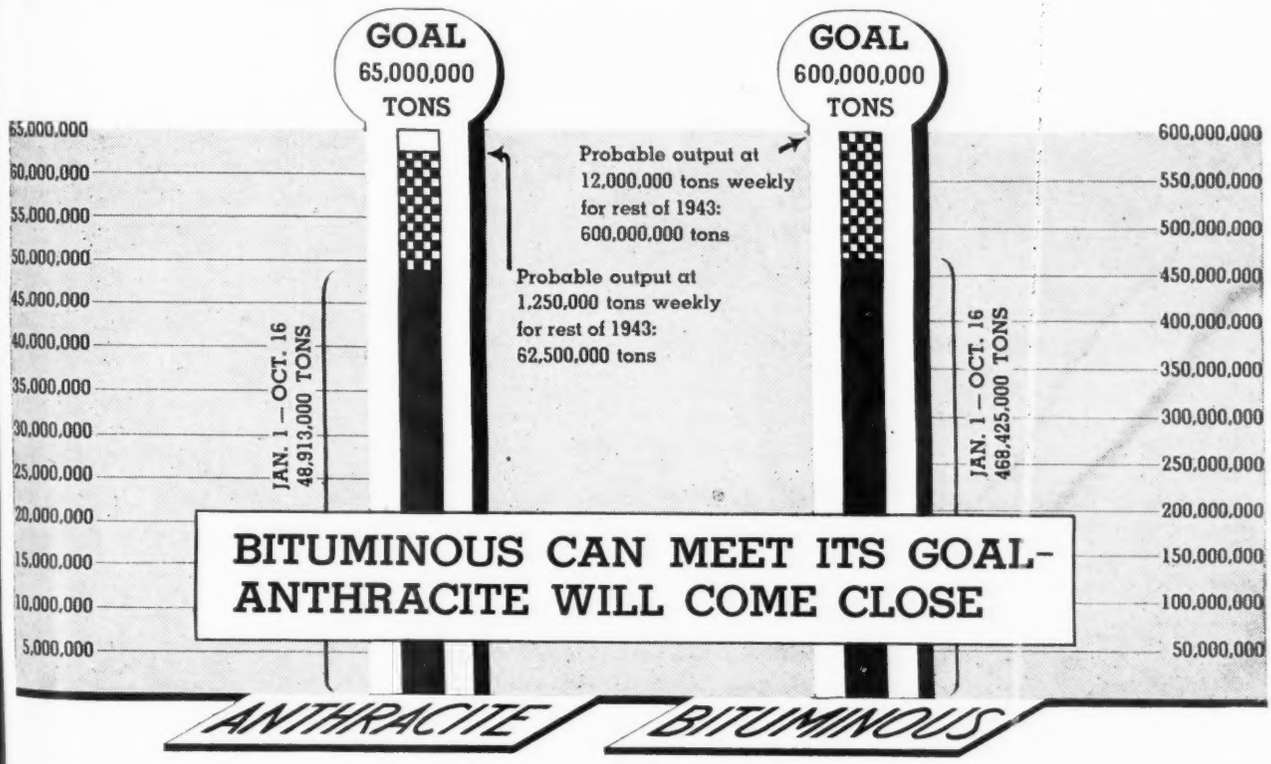
In the second seizure order, provision was made for present management to continue to function to the "maximum degree possible," and for return of the mines within 60 days after the restoration of the productive efficiency in accordance with the provisions of the War Labor Disputes Act, which act, paradoxically enough, was passed to prevent stoppages of work such as resulted in Seizure No. 2. Furthermore, the order provides that the government shall offer the miners a contract under the terms of WLB's Oct. 26 opinion on the Illinois agreement. Which leads to two questions: (1) What happened to the June 18 decision of the Board in the Appalachian case? (2) Why, with the Illinois operators ready to sign on the terms laid down by the Board, should it be necessary for the government to offer a contract, since ratification of the Illinois agreement inevitably would mean its application to the rest of the industry?

That Contract Question

Lack of a contract was the outstanding factor in both seizures and for most of the industry's other troubles since April, but logic would indicate that any agreement adopted be between the industry and its employees. If one group or the other proved recalcitrant, logic also would dictate steps to bring that group into line, rather than resorting to a subterfuge which penalizes the other.

The conclusion is that the administration, despite advertising to the contrary, did not chop Lewis down to size, criminal provisions of the War Labor Disputes Act and alleged sanctions in the Presidential order of Aug. 16 notwithstanding. Instead, subject only to WLB's final adjudication, Lewis was granted the opportunity of dealing with Secretary Ickes, whose sympathies with his demands are not only well known but have been set down in print under his signature. But since the goal is coal production, Seizure No. 2 found the operators ready to cooperate as in Seizure No. 1, hoping withal that any agreement, under which they would have to live after termination of control, would not embody terms too unreasonable.

However, "coal must be mined," in Presidential language, and Seizure No. 2 and its accompanying stoppage merely threw into higher relief the necessity for prompt, decisive action to maintain and, if possible, increase output—action on other than the contract front. It altered in no particular the basic problems facing the industry now and in 1944. If anything, it



WHAT MIGHT HAVE BEEN—Until the Nov. 1 stoppage, bituminous coal had a good chance of meeting its goal of 600,000,000 tons. Anthracite would have run well ahead of its 1943 total.

MILESTONES ON THE ROAD TO SEIZURE

MARCH 10—Appalachian conference convenes. Lewis makes it clear that a wage increase is his only basis of negotiation, regardless of wartime stabilization measures.

MARCH 24 — Northern operators agree to 30-day contract extension from April 1; southern group assents March 29.

MARCH 31—Anthracite negotiations start; union asks wage increase.

APRIL 8—Roosevelt issues "hold-the-line" order.

APRIL 22—War Labor Board takes jurisdiction in Appalachian case after Lewis refuses operator proposals for extension of original agreements until the end of the war.

APRIL 28—WLB refers Appalachian case to President Roosevelt after wildcat strikes increase in number and scope.

APRIL 30—Anthracite case referred to WLB, which directs continuation of negotiations.

MAY 1—Seizure of the mines ordered by Roosevelt after vain appeal for end of stoppage which became practically complete on first of month.

MAY 2—Lewis orders miners back for 15 days from May 4 just before Presidential radio appeal.

MAY 17—Lewis orders another truce until May 31.

MAY 26—Appalachian operators and union resume negotiations after WLB, on May 25, denies $2 increase and directs further discussion of portal-to-portal and certain other questions.

JUNE 4—Lewis orders resumption of operations for second time, effective to June 20, after walkout June 1 results in Presidential order and WLB orders suspension of negotiations.

JUNE 9—Central Pennsylvania announces willingness to sign separate agreement; proposal later falls through when union refuses portal-to-portal protective clause.

JUNE 18—WLB hands down new Appalachian decision, flatly rejecting miners' portal-to-portal pay proposals and directing signing of new two-year contract with certain minor modifications and concessions; Lewis ignores decision.

JUNE 22—Lewis calls off third stoppage, which began June 20, ordering men to return until Oct. 31 providing government mine operation continues.

JUNE 25—War Labor Disputes Act passed over veto.

JULY 9—Roosevelt admits inability to force Lewis to sign Appalachian contract directed by WLB June 18.

JULY 16—Some of Illinois operators sign with Progressives.

JULY 20—Illinois operators and United Mine Workers sign portal-to-portal agreement.

AUG. 16—WLB authorizes Ickes to institute 48-hour week; President issues order permitting application of sanctions against unions defying WLB.

AUG. 20—First mines (eight) returned by government.

AUG. 18—WLB reassumes jurisdiction in anthracite case.

AUG. 25—WLB rejects Illinois agreement.

SEPT. 23—New Illinois agreement signed, providing 8½-hour day and portal-to-portal payment.

OCT. 12—All mines returned by government; wildcat strikes start.

OCT. 26—WLB rejects Illinois agreement but states it could approve one carrying scale of $8.12½ instead of $8.50 for an 8½-hour day.

OCT. 28—WLB awards hard-coal increase of 32c. daily plus remission of certain charges aggregating some 25c. daily; Board also refers wildcat strikes in bituminous fields to the President.

OCT. 29—Roosevelt promises "decisive action" if miners reject WLB decisions and continue stoppages.

NOV. 1—President Roosevelt orders Seizure No. 2 when entire industry goes down as a result of general walkout.

emphasized them. In fact, seizure never would have been necessary and the circumstances which brought it about never would have existed had the union leaders accepted and put into effect one vital principle—selling the miners on their part in the war effort. And the administration is by no means without blame in that failure.

Ground has been lost, but great strides can be made toward heading off a production crisis in 1944 if the government and the miners will act in immediate concert with the operators:

To stop the drain on coal-mining manpower.

To sell the coal miner to the hilt on his vital part in the war effort.

To make it possible, once he is sold, for the miner to raise his output to the maximum possible daily, weekly and monthly.

At any other period in the history of the coal industry it might be perfectly legitimate to assert that these things could not be done quickly or all at once. But they must be done now and together to prevent a further loss of tonnage and a production crisis in the future, even if all other questions are settled.

What's the Rub?

The difficulties, in brief, are these: (1) Bituminous coal mining lost, according to the best available data, some 73,000 men between January, 1942, and August, 1943, while the anthracite loss was 14,000 (WMC Survey), and the drain is continuing; (2) absenteeism, while varying from district to district, is higher than normal—much higher in some regions; (3) lack of a contract since April and May has resulted in an attitude hardly consonant with efficient production, while seizure, uncertainty over wage, price and tax outlooks and various forms of government heckling have complicated management's task.

But if the three big problems of manpower drain, excessive absenteeism and productivity per man could be solved, most operators agree that a long step would be taken toward assuring production quotas. Each requires special—perhaps lengthy—treatment. There is, however, one measure promising quick results but also requiring the earnest cooperation of management, government and John L. Lewis—not the rank and file. It is: Selling the coal miner on his vital function in the war effort.

Making the miner realize his part in the war is the primary job today to avert a production crisis tomorrow—if not today. Detailed solutions of

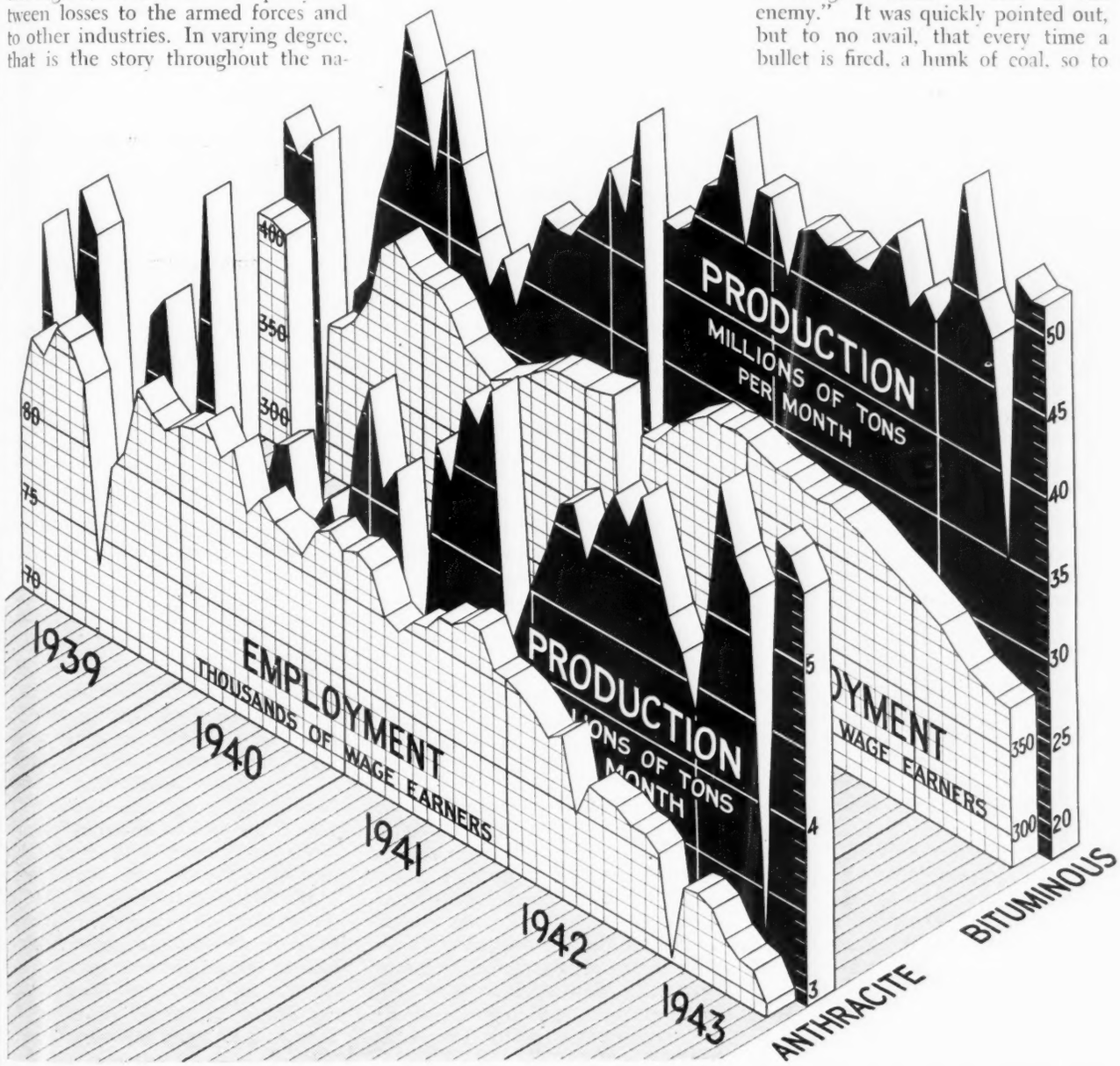
the specific problems can come later to bolster the effort and make the task of both labor and management easier. Every operator knows what the problems are. The solutions, however, are not so easy, especially since some government agencies and the miners' leaders apparently have not to date realized their importance.

It is obvious to anyone who has paid even passing attention to the nation's coal picture that the bottom of the manpower barrel has not only been scraped—it has been knocked out. One central Pennsylvania field, sampling mines over a period of two years, reports that 10,000 out of 40,000 employees have been drawn out of the region, divided almost equally between losses to the armed forces and to other industries. In varying degree, that is the story throughout the nation, with the possible exception of Illinois and Indiana—at the moment. The Far West is in as bad a shape as any section of the country, with one large operator reporting a turnover of 2,000 men a month. The situation there can be fairly described as desperate. Losses to other industries have been largely replaced—quantitatively if not qualitatively—but all in all the conclusion is inescapable—if the industry had back the men now in the armed forces it would have little or no manpower problem.

What is the answer? Obviously, it is to halt the draft of manpower from the coal mines to the armed service or at least check departures to other industries. Great Britain found that out too late. The United States is finding it out now, but nothing is being done about it. The decision still is left to the local draft boards, with the Selective Service System or the War Manpower Commission refusing to take any steps to influence it.

Again, the fact that coal's place in the war effort has not been impressed on either coal miner or public is at least partly to blame. One West Virginia man who has studied the situation thoroughly told of a draft board official who refused to grant a miner deferment with the comment that:

"So far, I haven't heard of anyone throwing a hunk of coal at the enemy." It was quickly pointed out, but to no avail, that every time a bullet is fired, a hunk of coal, so to



PRODUCTION MIRACLE AND PROBLEM—Coal output has risen to record heights despite a steady decline in "wage earners" as shown by monthly Bureau of Labor statistics. But repairing the damage of the Nov. 1 stoppage and achieving the new goals will require real action on manpower.

speak, is thrown at the Axis enemy.

This same West Virginia man summed up the situation neatly:

"No one has bothered to make it just as respectable to stay in a mine as to go in the army."

To add to draft difficulties, the new dependency allotments furnish an incentive, in the absence of some pointed sales work, for a man to elect the services. Under these new allotments, a wife and three children receive $120 a month from the government while the husband is in the army. That is plenty to live on, and, because it "has not been made respectable to mine coal instead of going in the army," many miners will be inclined to take advantage of the government's generosity. In contrast, many with long memories will ecall President Wilson's proclamation in World War I stressing coal's importance to the war effort and declaring it the "patriotic duty" of miners to accept deferred classification, stay in their jobs and, with management, give their utmost to a vital task.

Is Pay the Answer?

The loss, in many areas, of as many workers to other industries as to the armed forces also presents a problem difficult to solve. The answer of the United Mine Workers is: "Give 'em more pay."

Without more than pointing out that miners' earnings are exceeded in only a few other industries, it can be stated that losses still continue while the problem of absenteeism has, if anything, increased. Whether or not higher rates might be warranted on other grounds (WLB thinks not) there is little evidence to show that of themselves they will result in fewer quits or a reduction in absenteeism.

Lack of a contract, for which the administration cannot argue away at least a large share of the responsibility, undoubtedly has been a major factor in the present situation. There is scarcely an operator who will not vow that since the contract wrangle started in March there has been a definite, perhaps deliberate, slowdown on the part of the miners. Not all of it can be traced to inferior workmen. Coal cars branded "No contract, no sweat" point to the more likely answer—and to the deeper-seated reason: lack of war spirit.

The same reasons, and not necessarily too little money, are the logical explanations for the industry's absenteeism record. Exact data are hard to come by but some estimates place the average as high as 15 percent. Others contend that the true figure is nearer 8 percent, compared with 3 to 5 percent held in some quarters to be the norm. But in any event, absenteeism undoubtedly is higher than conditions in the industry warrant.

No campaign against absenteeism has proved universally effective, perhaps because the proper appeal has not yet been found and perhaps because the proper effort has not yet been put forth. Operators point out that they cannot tell what their work has accomplished because they do not know what the absentee rate would be without these efforts. They know only that the rate is high; might be higher, were it not for poster campaigns, patriotic appeals, talks with individual workers by labor-management committees or foremen and other educational measures.

What is going to happen if manpower continues to decline, if absenteeism continues to increase, if individual productivity continues to decline and if a different spirit is not manifested? Some indication of future events already is apparent. Before Nov. 1, operators almost universally were of the opinion that they were not getting any more coal in six days than they did in five. The 48-hour or longer week, they declare, will do little, in the absence of a new spirit and enthusiasm, to help production; will do something to increase absenteeism. Almost universally the story is that efficiency is falling off, older and untrained men are being employed, equipment is being worked too hard and repair parts are scarce. Too often the men who leave the industry are the best workers—the young and skilled employees.

TEN STEPS TO MORE COAL

1. Institution of a draft policy realistically geared to the necessities of preserving an adequate working force at coal mines.

2. Adoption of measures by the appropriate governmental agencies, in cooperation with labor and management, for checking the loss of miners to other industries.

3. Immediate, serious consideration by the appropriate governmental agencies of a program of releasing men from the armed forces to the coal mines to the limit possible without prejudicing military activities.

4. Immediate cessation of unnecessary scarcity preaching, with consequent stimulation of panic buying and hoarding, by government officials.

5. Adoption of a ceiling-price policy which will encourage every possible operation to produce the maximum possible tonnage.

6. Revision of tax policies to promote production by protecting properties now dissipating an irreplaceable asset at an accelerated rate with a substantially reduced return per ton.

7. Allocation to coal mining of an increased supply of production equipment, parts and supplies to compensate—at least in part—for manpower losses.

8. Adoption of all possible methods of increasing individual productivity by better use of existing and new facilities, better supervision and more and better training.

9. Whole-hearted participation in the campaign to conserve coal by more efficient utilization.

10. And most important, government, management and labor cooperation to the hilt on selling the coal miner—and the industry—on their part in the war, with some visible award for production excellence.

Can anything be done about it? Fortunately, there still is a chance. But before discussing a cure a survey of responsibility might be made on the theory that eliminating the cause will help effect the cure. A production crisis, if not already upon us, can be ascribed to the following—in about the order named:

1. John L. Lewis.
2. The administration.
3. The operators—to a relatively slight degree.

At Lewis' door because, not being sold on the war himself, he has made no effort to impress on his members the importance to victory of America's most basic industry. At best, he has impeded the war effort by calling work stoppages and at the worst he has used the gravest of national emergencies to aggrandize himself.

Administration Fails Too

At the administration's door because it has all too often scolded and pilloried the operators, who were making a sincere effort to produce coal, to such an extent that some have become disgusted and discouraged. It preached scarcity where none had existed. It failed to meet its responsibilities in the wage controversy from the very start, when it could have accomplished some real good. And finally, it has made little or no effort to impress on the miners the importance of their war contribution or to give the operators more than grudging recognition of the work they have done.

Then there is the matter of prices and taxes. Despite the support that heavy demands have given the price structure, there still are many mines operating at a loss. In normal times, these properties would have an opportunity to purchase equipment to cut cost or could be closed without affecting the country's coal supply. Now, with every ton vital, it is essential to keep such properties running and a price that would enable them to break even certainly seems logical.

As for taxes, all concede they are necessary. But when a property, squeezed between a price ceiling and the tax schedule, is shipping an irreplaceable asset at little or no net while government contractors are faring relatively much better under cost plus fixed fees, the moral becomes self-evident. To the operators' credit, let it be said that very, very few have permitted such considerations to interfere with production at the maximum possible rate, although the future holds just as many problems for them as it does for others.

When matched against the miners' officials and government, the operators appear by far in the better light. But it nevertheless is true that they have failed at times to grasp their opportunities for leadership, both within the industry and in its relations with the government and the public. And while they have done better than government and union officials, they have not gone as far as they could in selling the war to their employees.

The remedies do not come quite as easily, however, as assaying relative responsibilities. In the first place, most of the effective ones are predicated on government cooperation, which to date appears to be strictly rationed as far as coal is concerned. In the next place, the real solution would call for a complete about-face on Lewis' part—which might be a minor miracle in itself. But there are things that can be done.

If, as seems probable, it becomes impossible to obtain blanket deferment for essential coal-mine workers, then local draft boards, through the cooperation of both the local unions and the local operators, must be made to see the necessity for a more lenient policy. It also appears there will be no release of experienced coal miners from the services, although that policy would cure many of the industry's ills. The sole alternative then is to make the best of what there is.

Machinery Would Help

A partial solution presents itself in additional mine machinery—a solution which has the backing of the WPB's Mining Division and cooperating agencies. The division has authorized $75,000,000 in new machinery and repair parts for 1944. A fractional part of this machinery will go to Great Britain, sadly in need of it, and where it will head off additional drains on U. S. production for necessary foreign supplies; but all that goes abroad will be taken from the military supply, leaving an appreciably higher total for U. S. mines next year.

The industry certainly should heed WPB's plea to make its requirements known early. There will not be enough machinery, of course, but there will be more than there was last year. WPB has studied the situation in relation to the manpower problem, and believes the increase for next year will in some measure alleviate it.

A second opportunity is increasing individual productivity to the maximum by the best possible utilization of existing facilities and those to be made available in the future: this in addition to instilling the necessary enthusiasm among employees. This involves better planning, better supervision and, among other things, increased use of the available training facilities, such as those offered by the War Manpower Commission's Training-Within-Industry Division, with modifications, if necessary, to make them fit into coal mining.

Coal Saving Also

The third suggestion is conservation through efficient utilization. Great Britain would be in much worse shape than she is if her coal and power conservation campaign had not been seriously undertaken and conscientiously discharged. WPB and other government agencies have outlined a program which it is hoped will save 29,000,000 tons annually. The industry should support it, as it is doing, not only from the obvious point of view of helping to bring consumption in line with supply, but from the purely selfish standpoint of avoiding coupon rationing schemes already on the desks of WPB officials. And fostering efficiency, as the industry well knows, is the best guarantee of holding the business now and in the future.

But, finally and fundamentally, there must be a complete and thorough program to educate the miner in the importance of his task. On this hinges manpower, reduction in absenteeism, and increase in efficiency.

Management can help by a thoroughgoing educational program, by not forgetting they are in a war themselves and by exerting every effort to cooperate with labor-management committees and make them work.

Government can help by encouraging both the miner and the operator, by giving some visible and tangible award for work well done, such as the Army-Navy production "E," by abstaining from unnecessary scare talk and by assuring a price and tax policy realistically related to the production problem. Government should just keep one thing in mind: none of the production records of which it is so proud would have been made, not one of the "E" burgees would flutter so proudly from the flagstaffs at aircraft and armament plants and shipyards, if coal had not been produced first.

Labor can help by exerting its leadership to promote the war effort instead of hindering it, by ceasing efforts to increase its own gains at the expense of the public emergency, by becoming the most effective agent in really reducing absenteeism.

With all three pulling together, the task of producing coal for victory will be discharged in full.

VOLTAGE OU
In Two Step ive

Moving Substations to D stant ons Imp age in Two Steps—First nvol of Au Operated Inverted — S eel-A nstructio

By J. H. EDWARDS
Associate Editor, Coal Age

At 2 Northwest a 3-in. test hole was utilized for installing a 4,000-volt cable to a new underground substation.

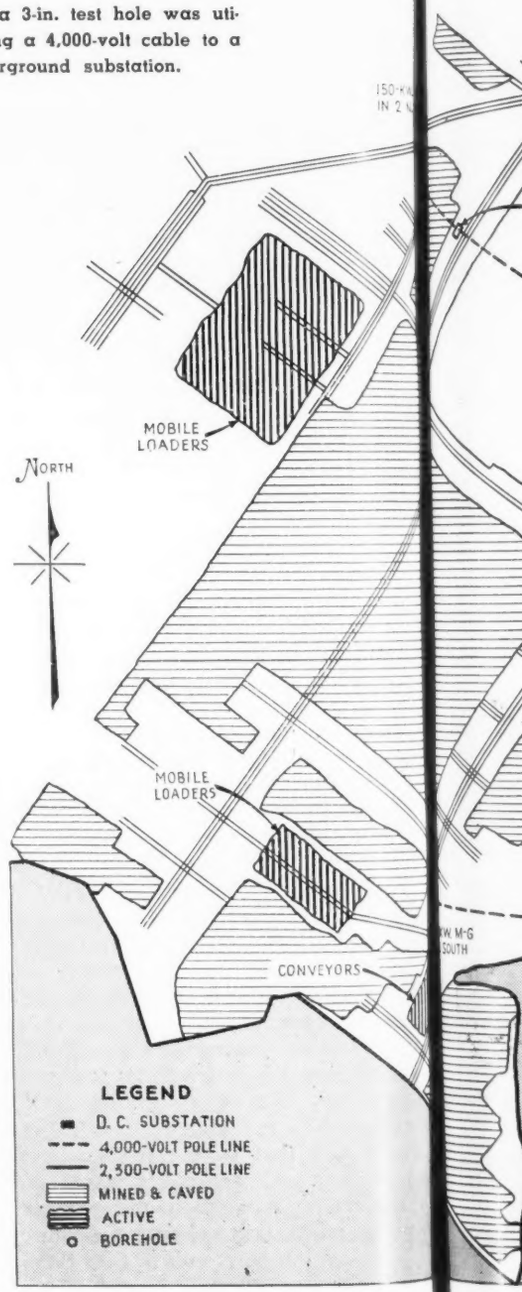
CHANGING from 2,300 to 4,000 volts has put new jump in the power at a number of old mines that had spread beyond the economic and practical limits for the lower voltage, especially with existing lines. Changing an entire plant at once usually is considered the best method, but the natural reluctance to tackle a complete job usually results in a lag which may be responsible for high power cost, low production and high maintenance. At the Nellis (W. Va.) mine of the American Rolling Mill Co., however, the change-over was made in two easy stages, the first in 1938 and the second and final in the summer of 1943.

Installation of a 300-kw. 275-volt d.c. substation underground near the southwest boundary of the property became desirable in 1938. A transmission distance of two miles from the power company's transformer substation indicated that installation of this new d.c. substation marked the logical time to start the change to 4,000 volts, especially since some of the future substations would be at least twice that distance.

Consideration of the problem resulted in a decision to change to 4,000 volts for this new substation only, leaving the rest until later. To accomplish this change the coal company purchased a rebuilt three-phase 500-kva. auto-transformer (General Electric) for installation near the power company's substation to raise the voltage from 2,300 to 4,000 for feeding the new unit. All the company's d.c. substations are synchronous motor-generator sets and their motor windings are adaptable to changing the connections for operation at the higher voltage. Another line feeding a structure distributing to other substations, the cleaning plant, fan and town lighting was left for the time being on 2,300 volts.

Now the southwest side of the mine is nearing completion and the center of the underground load will be shifted soon toward a section approaching the northwest boundary. For development preparatory to this shift in production locations, a 150-kw. generating unit was moved recently from an outside substation near the shop to an underground room on No. 2 Northwest. When installation of that substation was contemplated, it was recognized also as the logical time for the second and final change, thereby eliminating all 2,300-volt distribution in favor of 4,000.

That decision involved several problems, especially during war time, when new or rebuilt transformers and motors are hard to get and labor is scarce. The power company's substation, located not far from the Nellis office and store,



DOUBLED

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of Auto-Transformer, Now
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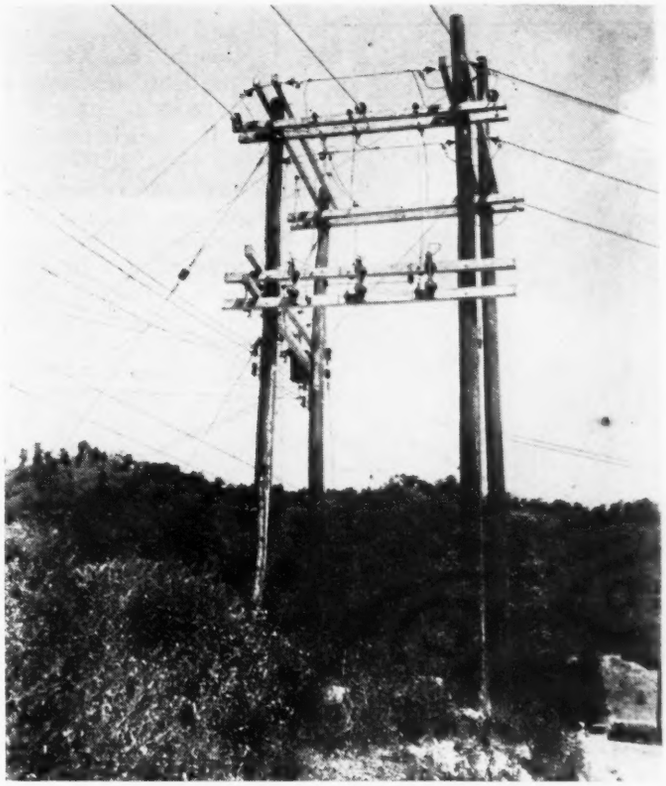
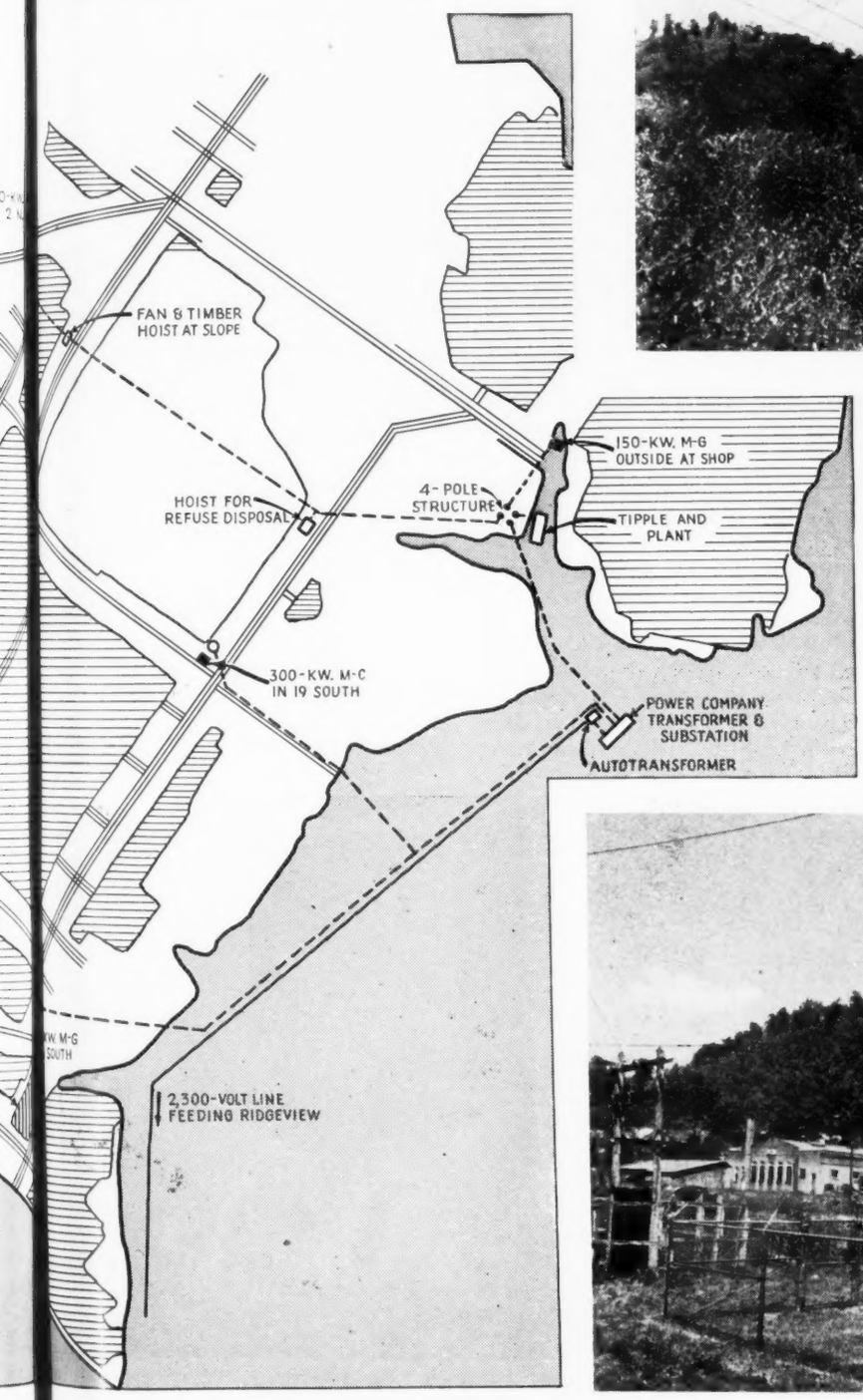
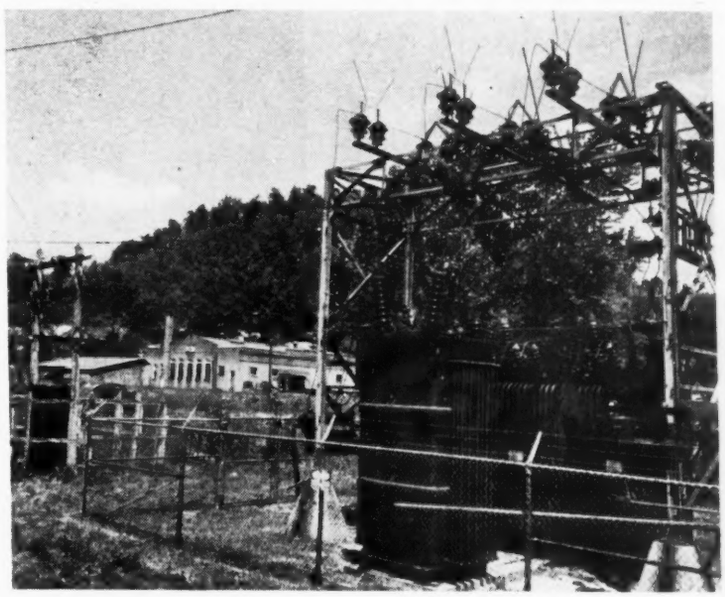


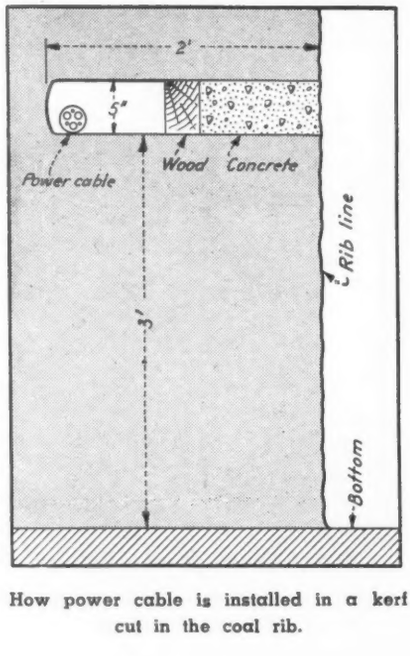
New four-pole structure from which 4,000-volt lines radiate to principal loads.



Map of Nellis Mine showing substations and pole lines.

Auto-transformer (at left between two wood poles) and power company's substation (right), with secondaries of three transformers connected Y and a spare transformer standing in the background.





How power cable is installed in a kerf cut in the coal rib.

consisted of three 500-kva. single-phase transformers connected delta-secondary to supply 2,300 volts. A complication was that these transformers supplied also, at 2,300 volts, a mine at Ridgeview adjacent to Nellis.

While the motors of the existing generating sets could be reconnected readily for the 4,000-volt supply there remained the problem of the 2,300/110–220 transformers for substation controls and the transformers of the same type for house lighting and general services. And in the preparation plant, where all motors except one 40-hp. unit are on 220 volts, the 2,300-volt motor could not be reconnected for 4,000. Ways were found, however, to do the job in each case without buying new transformers or rewinding.

First, the 500-kva. auto-transformer was sold to the power company for use inverted; that is, reducing from 4,000 volts to 2,300 volts, thus permitting reconnection of the main transformer secondaries to Y, giving 4,000 volts and yet continuing to serve the Ridgeview line with 2,300 volts. This change-over to a Y-connection, however, introduced the disadvantage that if one transformer failed, the remaining two units could not deliver three-phase 4,000-volt power. To remedy that situation the power company placed a fourth transformer (667-kva.) at the substation to serve as a spare.

To get 2,300-volt single-phase power for the existing town-lighting transformers a fourth, or neutral, wire was added to the line through the town as far as the d.c. substation near the shop and drift portal. The town transformers were then connected from a line wire to neutral but with the various ones on different lines so as to balance the load. Control transformers in the above mentioned substation also were reconnected to the neutral.

It was determined that the coils of the 40-hp. 2,300-volt preparation-plant motor (operating a crusher) could be reconnected for 220 volts and that the existing plant transformers, which were to be changed from delta to Y on the primary, had ample reserve capacity to take care of that additional 40-hp. 220-volt motor. Copper had to be added to reinforce the 220-volt feed into the plant, but the distance was only 200 ft.

When the fourth wire was added to the line and the voltage raised to 4,000, a new four-pole junction and switching tower was built to replace an original structure which had fallen into poor condition. The new one is of wood and is supported on creosoted poles of large size. From this point two 4,000-volt three-phase feed lines radiate. One feeds the preparation plant and shop substation and the other feeds a slate hoist, the mine fan and the new 150-kw. substation on No. 2 Northwest.

To get the power down into the mine for this new substation a 3-in. test hole was utilized. This hole, 150 ft. deep, was cased with 2-in. conduit grouted in from the surface to the coal. The three-conductor cable is rubber-insulated, braid-covered, has shielding over each conductor and includes three ground wires.

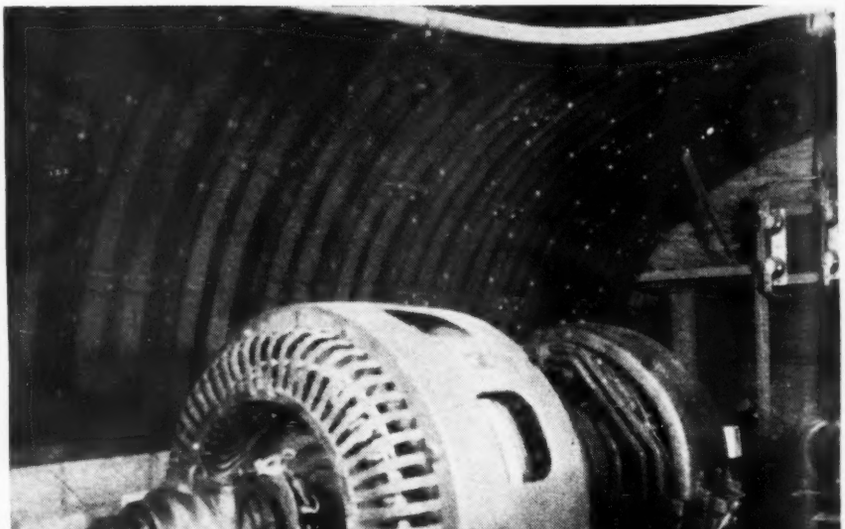
Steel conduit being a scarce item, a substitute method was used to protect the 4,000-volt cable for the 200 ft. from the bottom of the borehole to the substation. The cable was placed in the back of a 5-in. kerf cut 2 ft. deep into the coal rib 3 ft. above the mine floor. To protect and support the cable across a breakthrough, a concrete conduit with wood lining was built at the same level and supported on a concrete wall.

The underground substation room was built of bolted corrugated-steel sections of a type made by the American Rolling Mill Co. for air-raid shelters. This steel-arched roof rests on concrete-block side walls five blocks high. The space between the roof and the solid top of the mine was packed with mine rock.

Total d.c. capacity of the three underground and one outside substations is 900 kw. The units are manual-start but on the d.c. side all are equipped with automatic reclosing circuit breakers. Mine production is 30,000 tons per month and the power consumption over the same period is 340,000 kw.-hr.

Officials of the mine are cognizant of one slight disadvantage introduced by the complete change-over from 2,300 to 4,000 volts. That is that no longer can the transformers supplying 220-volt three-phase be used in open delta if one of a bank of three fails. But experience shows that the chance of failures with these low-voltage transformers is very slight indeed if they are not unreasonably overloaded and if the oil is maintained in good condition.

Alva E. Oakley is superintendent and A. C. Cunningham chief electrician for the Nellis mine. In general charge of this operation and of the Colcord Coal Co. are Charles W. Conner, vice president; Wayne M. Davis, general superintendent, and Paul R. Maxey, mining engineer, all with headquarters at Montcoal. The West Virginia Engineering Co., of Charleston, is retained as an electrical consultant.



Overhead protection in the new substation consists of air-raid-shelter steel.

MORE TON-MILES

The Goal in Modern Coal-Mine Haulage

Maximum Ton-Miles per Dollar the Test in Main-Line Haulage—Good Track Is the Starting Point—Modern Locomotives and Mine Cars Cut Cost, Improve Efficiency and Promote Safe Operation

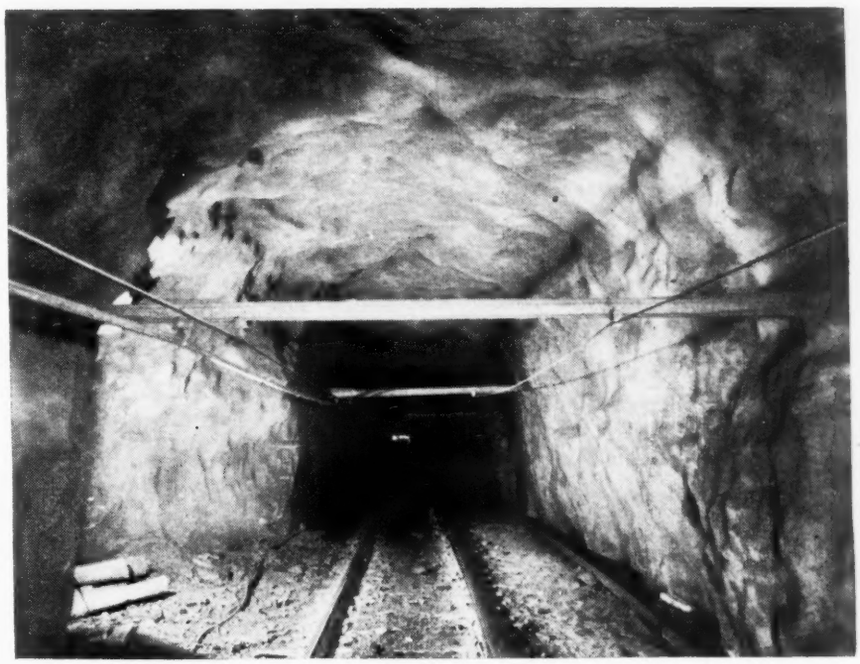
THE "TON-MILE" is the yardstick for measuring railway freight costs. It is equally applicable to underground mine haulage, for the problems of operation and the elements of cost are much the same.

Coal-mining men sometimes forget that mechanical mining is not limited to face operations alone. Modern coal mines, on the contrary, are mechanically equipped from entry driver to loading boom. While some links in this chain of operations offer greater potential savings than others, every link is essential. One of the most important is transportation from parting to hoist or dump, commonly termed main-line haulage.

While there are many efficient haulage systems in the mines of this country, there are many more instances where main-line haulage has not kept pace with developments at the two ends of its system. Good track, long curves, easy grades, mine cars designed for the job, suitable locomotives, efficient power supply and signal and dispatching systems are the marks of efficient main-line systems. Where all these factors are properly integrated the mine-haulage system yields the maximum return.

The environment of underground railroading, with its low roof, restricted right-of-way and electric power, adds some hazards the steam railroad does not have to contend with. On the other hand, there are times when fullest advantage of possible safety measures and economies is not taken.

Understanding of the relative values of the elements involvd stimulates better construction and induces the use of modern rolling stock and operating methods. It makes evident that good construction is sound policy; that it is cheaper to keep a machine up than to "fix it up"; that elimination of lost time during the working shift is one of the secrets of maintaining smooth labor relations as well as profitable operation.



"Par" track speeds haulage and promotes safety.

No Substitute for "Par" Track

The foundation of successful railroading is good track. On one phase, an Illinois operator put it this way: "Treated ties are the one best thing we did for our mine tracks."

Investigations made by the American Mining Congress, and reported on in 1937, indicate a treated-tie life of 20 to 30 years on American railroads. Treated ties in service in mines for periods of 7 to 17 years were without evidences of decay. Untreated mine ties last only two to five years, according to the same report, which further states: "When the expected life of a main haulage track is longer than the average life of available untreated ties, it is economical to use pressure-treated ties." Moreover, "the additional cost of a treated tie usually will be more than offset by the saving in cost of the first renewal of an untreated tie."

Of a long list of native woods, oak provides the outstanding example of being able to stand up without using a tie plate. At the other end of the list, short-leaf pine requires tie plates. For woods between these two, it is a matter of judgment, depending on the hardness of the wood and traffic conditions. With heavy rails, another operator says tie plates are unnecessary, particularly because wheel loads are not more than one-quarter or one-third that prevailing on steam railways. The steel tie also is employed by a number of operators for main-line or secondary track and also for use with

wood ties in maintaining gage and track condition.

The length of mine ties usually recommended is 30 in. more than the track gage. Table I indicates the recommended dimensions and spacing of ties for main-line mine track.

Mine track has the double duty of carrying trains and carrying electric power. Heavy rails on treated ties, with a good subgrade and crushed rock ballast, long curves, good drainage and good bonded or welded joints make a "par" track. In dry mines, gob may be a satisfactory ballast. The average track is more likely to be ballasted with cinders, coal or gob, with crushed rock used only in wet spots. Besides making a good return conductor, heavy rails reduce derailments, increase the life of wheels and tires and require less sand.

Welded joints, in addition to their conductivity functions, result in a continuous running surface and thus make possible smoother, safer operation at higher speeds. Most welded joints have a conductivity equal to that of the rail section. At one modern mine using 70- and 80-lb. rails with Thermit-welded joints, it has been stated that derailments are nil. In this case, with two sizes of rails, the cost of welded joints was reported as no more than joints made with offset splice bars.

Other reported joint costs are: 40-lb. arc-welded, angle bars retained, $0.628 for gas, rods and labor (*Coal Age*, July, 1936); 60- and 80-lb. arc-welded with plate under joint, $1.75 maximum (*Coal Age*, December, 1939); 70-lb. Thermit-welded, $5,245 (*Coal Age*, January, 1940); 60-lb. bronze-welded, $2.03, $2.21 and $2.31 (*Coal Age*, October, 1941). Even those involving the highest cost were reported to be cheaper in the long run than the regular joints, in addition to their other advantages.

The value of steel rails as electric conductors has not been sufficiently stressed. For practical purposes, each 10 lb. of rail weight is equivalent to 100,000 cir.mils of copper. For example, two 60-lb. rails are equivalent to 1,200,000 cir.mils of copper, or a 4/0 trolley plus a 1,000,000-cir.mil feeder. The comparative costs of steel rails and copper as electrical conductors balance at about $40 per gross ton and 20c. per pound.

Equal in importance with the rail as a part of the electrical circuit are the trolley wire and feeder. Normally rail and copper should be equal in conductivity. However, when only haulage is involved, it may be permissible to have less copper in the positive line than steel in the track.

Table I—Size of Main Line Haulage Ties

Tie Size, Inches	Weight of Rail, Pounds Per Yard	Spike Size, Inches	Tie Spacing in Inches, Intermediate	30-Ft. Rail Joint
4x6	60–75	1/2x3 1/2	21 1/2	16
5x7	60–80	1/2x4 1/2	22 1/2	22 1/2
6x8	80–100	9/16x5 1/2	24	24

Table II—Potential Work per Dollar of Investment Cost

Locomotive			Motors				Cost in Percent	
Wt.	M.p.h.	Hp. per Ton	No.	Type	Hp.	75°C Rise Hr.—Min.	Per Ton	Ton-Miles per Dollar
20	8.5	14.2	3	A	95	1—45	100.0	100.0
20	9.5	12.5	2	B	125	0—50	84.0	104.5
20	10.0	15.2	2	C	152	1—15	91.5	117.0
25	10.0	15.0	3	B	125	1—15	93.0	113.5

Modern Locomotives for Uninterrupted Tonnage

The mines of 1943 demand scheduled trips for maximum tonnage to meet war requirements. Under such pressure, only a strictly modern locomotive can work day in and day out with no more than a swift inspection, minor adjustments and scheduled lubrication. Main-line hauls seldom have an extra locomotive. Therefore, only locomotives with up-to-date features can make the grade.

Most of the earmarks of a modern main-line locomotive are listed below. The list might be altered slightly without changing general principles, and is compiled from the user's viewpoint.

Shoe or glider-type collector—improved operation and life in hard service.

Contactor control—long life of parts.

Fireproof wiring—life and safety.

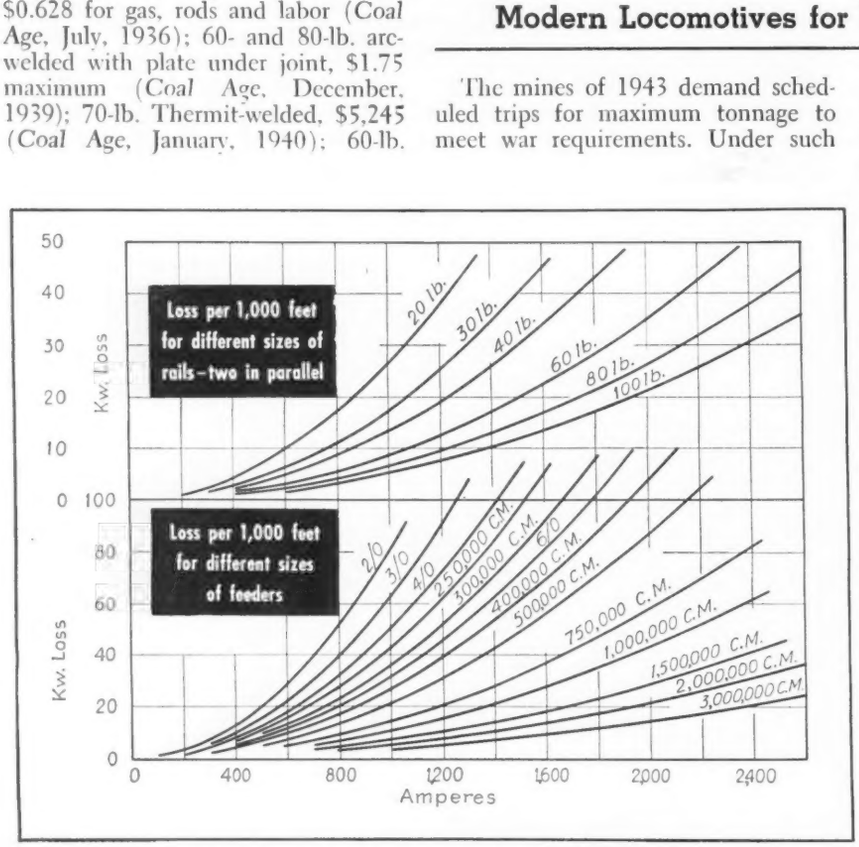
Steel continuous conductor resistors—low maintenance.

Blown motors—15 hp. per ton—continuous rating.

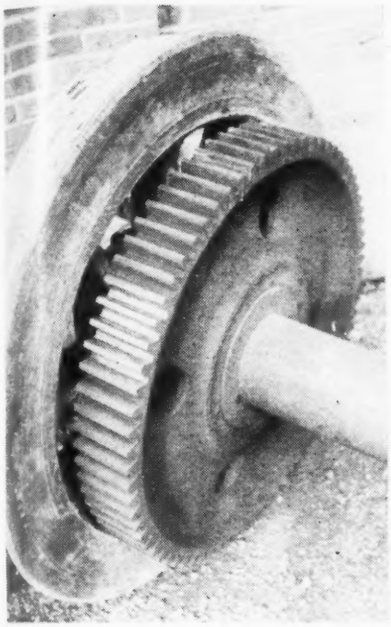
Dynamic braking—where grades are long.

Spherical roller bearings, labyrinth frame heads—life.

Steel heat-treated pinion, tapered armature shaft—true.



How kilowatt loss compares in track and feeders.



When pictured, this locomotive gear had been in service ten years. Four years later it still looked the same—a tribute to good design and maintenance.

Solid-steel heat-treated gears pressed on axle—life.

Grease-sealed axle liners or roller bearings—life.

Roller journal bearings—life.

Rolled-steel side frames—strength.

Cast-steel or arc-welded bumpers—rigidity.

Long wheelbase—steady on track.

Equalized axle suspension or long springs—to hug the rails.

Some of these points may be subject to some debate, but experience already has rendered a decision on most of them. A few perhaps merit explanation.

Slider collectors are far more satisfactory for heavy locomotives than trolley wheels. Arcing from wheels forms nodules on the wire which will quickly wear a slider out. So it is necessary to run all trolley-wheel-equipped locomotives "light" over lines where slider-equipped locomotives operate. All trolley wires where sliders are used must be lubricated at regular intervals.

Every builder has motors in various designs and rating for application to any conventional locomotive, which may be equipped with two or three motors. One of the difficult problems is to get enough horsepower into the available space—a reason for putting the frame outside the wheels and for a long wheelbase, which some operators object to but which is essential for roadability.

Traction motors are rated at 75 deg. C. rise in one hour. But when applied to locomotvies of various speeds and weights the actual performances vary so much that a study of several motors should be made before making a decision on what motor to use. Table II was the result of such a study. The problem was to arrive at the relative ton-mile values of various combinations of locomotive weight, motor horsepower ratings and number of motors per locomotive. While the dollar values might not apply today, such a study opens up interesting possibilities and shows what changing conditions do for standard equipment.

Involved in this same study was the effect of fan ventilation (blowing) of "B" motor. The figures follow:

1-hr. rating without blowing, 125.0 hp.
7-hr. rating without blowing, 64.8 hp.
7-hr. rating with blowing... 100.0 hp.

The great extension of armature life by blowing motors is so universally known that it needs little mention here. It might be noted, however, that with pauses at the two ends of the trip and the usual half-hour lunch period, practically 100 percent seven-hour rating is possible by blowing haulage motors.

One more point is well worth mentioning. Gears and pinions are a bugbear to many coal operators. In spite of their much shorter life, split gears often are demanded because they can be removed and replaced without pressing wheels off the axle. The real remedy lies in a locomotive so designed that the gears will never wear out. When gear shaft centers are maintained, gears wear little. That simply means that locomotives equipped with motors having labyrinth frame heads and spherical roller bearings on the pinion end; forged-steel heat-treated solid gears pressed on the axles; and labyrinth grease-sealed axle liners, properly lubricated, will have no material bearing wear and the gear teeth will last indefinitely.

As a case in point, a certain mining company installed in 1929 two new 20-ton two-motored locomotives, with series parallel control, built to the specifications set forth, less slider collector and dynamic braking, and equipped with motor "C" in Table II. Because the trolley-wheel contacts would not carry the current, they had to be abandoned immediately. The grades were against the loads, so dynamic braking did not particularly matter. These two locomotives, in the intervening 14 years, have accounted for approximately 23,000,000 ton-miles of coal and have jointly traveled nearly 300,000 miles.

The original armatures, gears and motor and journal bearings are in service. Because of a broken armature shaft, one pinion has been replaced. At the end of ten years the axle-bearing liners were replaced, being slightly worn. To date the gears show trifling wear and are good for 10 to 25 years of additional service. These locomotives have not lost a work day.

This unusual record is not a miracle. It is the result of doing things the right way. This record can be duplicated by any mining company that will have its locomotives built to last and then take care of them. Many old locomotives can have some modern parts applied to them.

Modern Mine Cars for Efficiency

The questions of mine-car size and appointments are as important as they may be controversial. Most coal operators have ideas of their own and, perhaps, controlling conditions which may settle many details in their mine-car design. However, many of the elements characterizing a good mine car are not limited to size, type or make.

Maximum capacity is one proved advantage in mechanical loading. But size is not the only advantage of modern design. Others are lower maintenance, smoother operation, greater safety and tidy power savings.

No other one thing has done so much to save transportation power and lubrication costs as anti-friction bearings. The lowering of rolling friction from 30 to less than 15 lb. per ton is a major saving. "Par" track should cut the figure below 10 lb. Nearly 20 years ago, experiments indicated a rolling friction as low as 8 lb. per ton under laboratory conditions.

Builders and most users are coming around to long-wheelbase cars. They stay on the track better and pound less. The old idea that a short wheelbase was necessary to make cars easy to rerail by the mule driver might have been sense in mule days. Today a short wheelbase means more derailments.

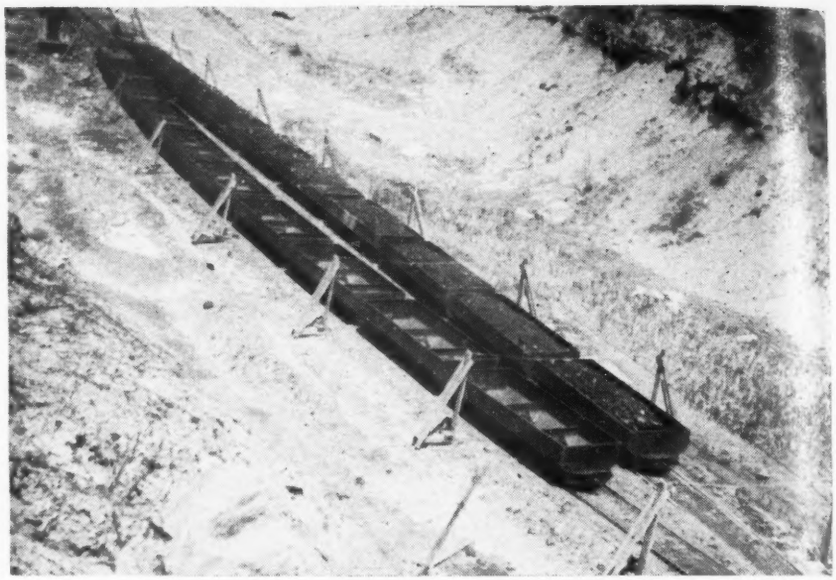
Car weights are being reduced by the use of special alloy steels, thus increasing the pay load proportionately. Corrosion-resisting alloys increase life and cut maintenance. As a sidelight, some mines have found that combination (wood and steel) cars suffer least in wrecks and are easiest to repair, and that steel car bodies with the top two-thirds removable are much easier to "roll out" than solid steel bodies. But

"par" track should almost eliminate derailments. One coal company with near-par track insists that derailments are almost nil.

Broken wheels and axles are responsible for many wrecks. But, again, several companies, using different types and makes of wheels, have experienced so few broken wheels as to almost eliminate that as a cause of wrecks. "Par" track might put that over the hump.

Spring suspension or rubber pads help materially. Apparently, most users don't appreciate what pads or springs will do in the way of reducing shock. The railroads would not dream of getting along without springs, notwithstanding streamlined tracks. Spring bumpers and drawbars provide similar advantages in starting and stopping.

Another feature with a strong safety and operating appeal is automatic couplers. These offer major advantages in eliminating coupling and uncoupling injuries, saving time, smoothing trip operation and preventing derailments. Twenty percent of all haulage accidents are attributable to hand coupling. When new cars are up for consideration, automatic couplers are well worth looking over.



Modern cars provide large capacity and construction features assuring smoother, safer operation and low maintenance.

Power Behind the Train

Continuity of service, a required condition for uninterrupted output, is maintained only with good substation equipment. Motor-generators, rotary converters and mercury arc rectifiers are the types of conversion equipment that directly supply most d.c. mine power. They all have their proponents, points and headaches. They have all proved to be reliable to the necessary degree, and they are all subject to possible failure. Standard equipment in all these types, however, is reliable when properly installed, protected and cared for.

Since locomotive motors are designed to work at 250 volts, that is the voltage at which they are most effective. Normally, motors are guaranteed to deliver their rated power at 10 percent over- or under-voltage. The range at the motor, then, should not exceed 275 or fall below 225 volts. The first is the usual legal top limit and the second is the safe bottom limit. For best results, these limits should be observed.

There are other considerations. Actual power available must meet the need at every point on the line. Positive wires must be suspended from supports and insulators that are adequate mechanically and electrically. That includes roof protection to prevent entry falls.

Mine haulage approaching the aspect of railroads physically and railroad operating practice is being copied. Speed is increased because of long hauls. This higher speed is possible as a result of better track, improved rolling stock, dispatching and block signals.

Years ago it was discovered that the scheduling of trips smoothed out transportation kinks and upped production. The adoption of manual and automatic block signals and dispatching add flexibility, increase capacity and promote safety. With a double-track main haulage, automatic signals prevent rear-end collisions and protect trips against running into lost cars.

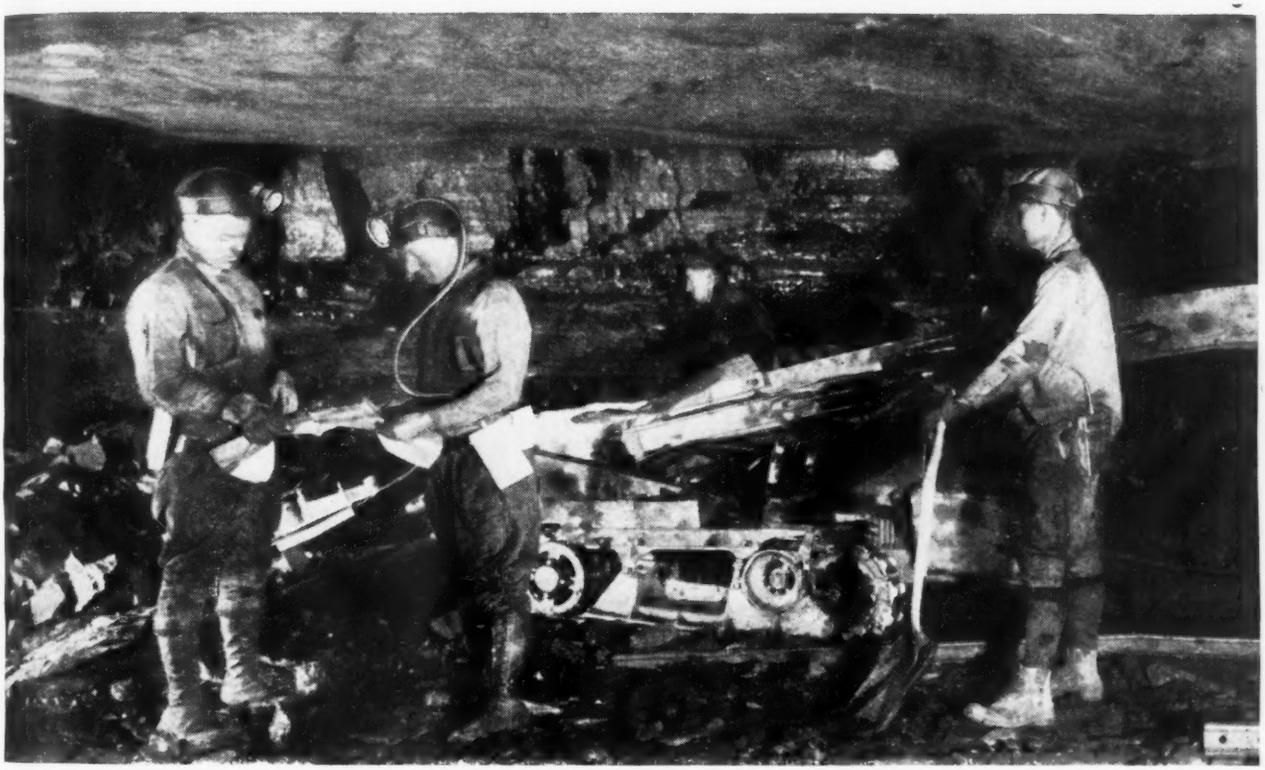
With numerous safety devices and tested methods of construction available, the grim fact remains that 20 percent of mine accidents are attributable to haulage. When exposure is considered, haulage appears to be the most hazardous job in the mine. To repeat an earlier statement, "Most of the things that lead to lower ton-mile costs also promote safety and conserve equipment." From a purely selfish point of view, modernizing of haulage practice would seem to mean dollars to the good—doubly so as mechanical processes multiply and the cost of manpower mounts.

Power and maintenance savers—new anti-friction-bearing trucks for old cars.

TRAINING BENEFITS

Well Repay Both Company and Supervisor

How to Do His Job and Lead Men Are Vital Qualifications for a Coal-Mine Supervisor — Both Supervisors and Management Realize Cash Benefits When Proper Training Is Afforded and Put to Use



Mechanized coal mining puts a premium on knowledge and leadership.

By ROBERT LILLY
Industrial Counselor
Bligh-Palmer & Co.
Mt. Hope, W. Va.

THE JOBS of foremen and other supervisors at coal mines are no different from those of supervisors in other war and essential civilian industries. They all have vital parts in winning the war and keeping their industries fit to meet the demands of the future through better service and lower cost. With ever-increasing demands for coal, with less and less labor available and with new mining and mechanical methods to be learned and installed, the qualifications of a good mine supervisor are more stringent than ever before in history.

What does this mean to supervisors—and to the management which relies on these supervisors? It means education and training—education and training which supervisors should be seeking and which management should be making provisions to supply. Both gain in dollars and cents, and with them the industry and its employees, with each increase in understanding of the supervisors' task and how it can be accomplished most efficiently.

Men, materials and time are the three basic elements in production. They represent a tremendous cash investment. The return on materials and equipment, and on time or payroll investment, depends entirely upon men. What men do depends in turn upon how they are led, as good leadership is the one thing that transforms these elements into a marketable product providing the consumer with the maximum benefits at the lowest possible cost.

To the rank-and-file employee, his immediate superior represents the company and its policies. How well he does his job, therefore, should be of as much concern to the management as it is the supervisor himself. The mine foreman or supervisor must be a leader. He must, among his

other qualifications, know and understand human nature. Each new worker, for example, should receive the same welcome and sympathetic treatment that the supervisor himself would like if he were starting out. He should be thoroughly grounded in safety regulations and in the best way of doing his job. Making the new man feel from the first day that he is wanted and welcome is the best guarantee of keeping him as a happy, efficient employee.

The mine supervisor must take every man's complaints seriously, as each one is taken seriously by the man who offers it. Better still, grievances should be nipped in the bud, rather than being neglected until they grow into complaints. Loss of temper is a luxury too costly to indulge in.

Waste a Big Item

Getting men to look upon time and materials as money is the big task of every foreman. Waste is a tax on production that yields returns to no one. Stress always should be laid on the fact that no one ever was hired to waste materials but many have been hired to save them.

Above all, safety is the task of the supervisor—backed up by management. Safety—first, last and always—must be talked and practiced forcefully and unremittingly, since safety is not a one-man job but the result of organized vigilance.

More—much more—might be offered on the qualifications and duties of the mine foreman or supervisor. He can be a leader or a leaner. He may know the job thoroughly and in detail and be highly trained in mine practice, management, labor, laws and policies. But he still may fail to lead, and the day of the driver is gone. Employees today will respond when they are properly led—when they are shown that their work means something, especially when done the safe, efficient way.

The conclusion is inescapable. First, the foreman must know his job and keep abreast of new developments. Second, he must have an appreciation of good human and employee relations—the ability to lead and inspire confidence in the company and respect for its policies. Thus, men will cooperate and work *with* the supervisor (and his company) rather than for him. Third, and equally if not more important, the supervisor must be a good salesman, since supervision is largely a selling job—selling ideas, selling safe and efficient methods and selling the company as a good outfit to work for.

Every good executive must have the faculty of selling other people—making them want to work for him or do a better job for him. Today, management, although faced by the greatest production task of all times, is doing an outstanding job. While it is doing this job and breaking all production records, it can strengthen the leadership of its supervisory forces by solving the all-important personnel problem now and in the postwar period. Experience has shown that leaders can be found by training them within the existing organization. Serious attention given to association, cooperation and education will help materially in reducing accidents, maintaining higher managerial efficiency and raising production.

Poor supervision of individual workers can hamper the production of an entire mine. Andrew Carnegie once said: "I'll pay the most to men who can handle others." Carnegie was a brilliant leader. He understood men—knew what they wanted—how to inspire them—how to make leaders of them. "Paying the most" was only a part of his plan for building leaders. He knew that the leadership exercised by supervisors reflected exactly the leadership displayed by management. Supervisors deal with their subordinates exactly as their superiors deal with them. So Carnegie taught them to be real leaders. He had no time for and gave no promotions to key men who leaned on others—on their superiors, on other workmen, on chance or on good intentions, traditions or prejudices. He demanded leadership qualities and then paid the most.

How to Get Training

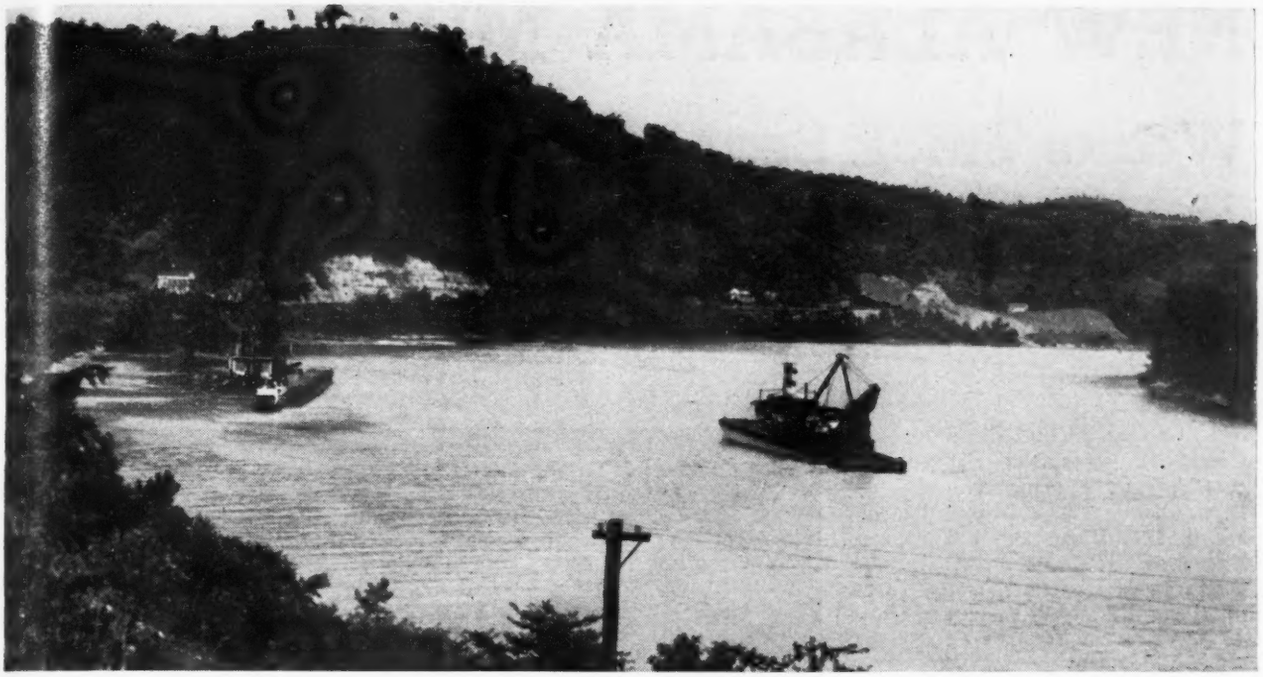
Some leaders are born. Most, however, are not so lucky. So, for both the supervisor and the management which depends upon him, keeping abreast of his job and the best way of handling it becomes a matter of profound concern. Where can the supervisor get the skill and knowledge he needs if it is not already available in his own organization? The answer is: mining extension classes, short courses in mining and correspondence and home-study courses in the principles and practices of mining and mining supervision. In these days, with many mines working triple shifts every day in the week, supervisors may have little opportunity for getting out to attend classes and practical demonstrations. But that does not rule out the very material advantages to be derived from home-study courses in handling men and getting out the coal to meet war-production demands. Such courses are a link between the top executives, the key men and the employees. Weekly lessons for a stated period, such as a year, is an excellent home-study arrangement. It keeps the leaders looking forward to the next lesson, in addition to creating a feeling that they are an integral part of the chain of management and production, thus better fitting them for their respective jobs.

Training, of course, should be adapted as far as possible to the personality of the man taking it. As each one learns at a different rate, pushing one too fast may cause him to lose confidence, while another who picks things up quickly may lose interest if new data come along too slowly. In any event, present training methods usually can be greatly improved if everyone concerned will take the time to think about improving them.

Continued Study Essential

A sad mistake the majority of foremen make is to quit studying after they pass their State examinations. Companies make an equally sad mistake in not encouraging study designed to improve supervision and providing the facilities for it. Most men, when working for a certificate, are serious and diligent students. If they were encouraged to keep up their studies afterward, how much better it would be from the standpoints of safety and coal production! Such studies can be diversified to fit the advanced requirements of the respective key men or leaders. In addition to home-study or other instruction, regular meetings between supervisors themselves or preferably with management offer an unexcelled opportunity for gaining cooperation and developing improved production and safety methods.

Money spent in helping supervisors improve themselves is the best of all investments. Returns in more production, higher efficiency and greater safety have proved this statement over and over. Many mines are now highly mechanized and the list is growing steadily. "We can't afford to spend money on training our foremen" is a stand scarcely calculated to fit a producing organization to compete with those who are equipping their men to do their jobs safely and efficiently. Skilled men who know their work are the best of all guarantees that the investment in time and materials will yield the return necessary for a sound coal-mining industry now and in the years to come.



Coal from Ohio River water. Left is the cleaning-plant boat, towboat and barges. Right is the dredge and raw-coal barge.

RIVER COAL OUTPUT

Boosted by Changed Handling Methods

WITH A NEW DREDGE and a change in method of handling the raw coal from the dredge to the floating cleaning plant, Rivercoal, Inc., has increased production of coal from the Ohio River bed to 10,000 tons per month. On days when the dredge loads coal exclusively instead of removing sand and silt overburden, the production of cleaned coal reaches 700 tons for the single-shift work day. This mining is in the natural seam—Pittsburgh No. 8—averaging 8 ft. in thickness including partings.

Along a 10- to 15-mile stretch of the river between Wheeling, W. Va., and Powhatan Point, Ohio, the uneroded seam is present over many areas of the river bottom and in some places is free of overburden. Pitch of the seam is downriver but at a degree slightly greater than the river fall, so the overburden is thicker downstream.

Mining was started in the summer of 1942 and at present is being done (see illustration) in a bend of the river 4 miles upstream from Powhatan Point and 14 miles downstream from Wheeling. The output is delivered by barge to a plant of the Pittsburgh Plate Glass Co. 14 miles downstream at Natrium, W. Va.

The lease is with the Public Land Corp. of West Virginia, because the boundary between that State and Ohio is at the low-water line along the Ohio shore. At the location now being worked, coal with as much as 5 ft. of overburden has been mined. The usual practice is to strip in the morning and load coal in the afternoon. Successive cuts are made 30 ft. wide by 200 ft. long with the long axis parallel to the stream. In that way the dredge works across the river, taking a swath 200 ft. wide. With the hope of raising production to 20,000 tons per month, a second shift is under consideration.

The dredge used for the first few months had a 2-yd. dipper and was capable of digging to a depth of 23 ft. below the surface of the water. It was replaced by a larger unit with a 3½-yd. dipper and a reach permitting digging 27 ft. below the surface.

Originally, the dredge dipper deposited the coal directly into the hopper of the floating cleaning plant. Now it loads it into a barge, which is then towed to the cleaning plant anchored at a convenient point nearby. With the plant detached from it the dredge is more maneuverable, the washer gets a steadier feed of coal and needs run fewer hours. This plant is equipped with screens and a jig washer, all built by Jeffrey. The plus 4-in. is hand-picked, the minus 4-in. is washed and the entire output is loaded as run-of-mine. A steam-driven 440-volt a.c. generator on the cleaning-plant barge furnishes power for operation of the preparation equipment.

Offices of the company are in the National Bank of West Virginia Building, Wheeling. Walter Jeffrey is president; Everett Drennen, vice president and general manager; Hazard Okey, vice president; Harry Supp Jr., treasurer; Stanley L. Jones, secretary, and Ralph Krasevec, superintendent.

NEW ALABAMA MINE

Works Thick Seam in Blue Creek Basin

New Blue Creek Mine Uses Slope Sunk During World War I—Equipment Designed to Make It a First-Class Operation — Unusual Type of Top Coal Provides a Good Roof in Haulways and Aircourses

TO ITS OPERATIONS in the Blue Creek basin of Alabama, served by a central washing plant at Johns, the Black Diamond Coal Mining Co. has added a fourth producer known as Blue Creek mine of the Blue Creek Operations. It is a reopened slope mine with a wholly new plant and equipment to make it a first-class development. The seam is 7 ft. thick and has a tender slate top requiring heavy timbering after the upper 2-ft. stratum of coal has been mined.

The acreage is leased from the Tennessee Coal, Iron & R.R. Co., which opened the mine and operated it a few years about the time of World War I. It had been shut down for 20 years and no top equipment of value was left when Black Diamond took it over and started rehabilitation and new development in the winter of 1942.

The Blue Creek seam is mined only in a basin 7 miles long and 2 miles maximum width. Compared with most Alabama coals the volatile content is low (23 to 28 percent), the carbon high (63 to 68 percent) and the sulphur low (0.6 to 1.0 percent). Ash content of the washed coking coal averages between 7 and 8 percent. About 60 percent of the output of Black Diamond's Blue Creek goes to coking plants. Other outlets are steam, blacksmithing and domestic.

The Blue Creek seam is classed as one of the Mary Lee group occurring in a small separate basin on the southeast border of the Warrior coal field. Two to 2½ ft. from the top of the seam is a 6- to 8-in. persistent stratum of coal of dull gray color and oölitic structure somewhat resembling coke in appearance and known throughout the field as the "gray band." Locally, however, the whole thickness of coal from the bottom of the band to the roof is termed the "gray band," although it is all good coal. Microscopic studies have shown that the gray color and oölitic structure are due to iron carbonate concretions.

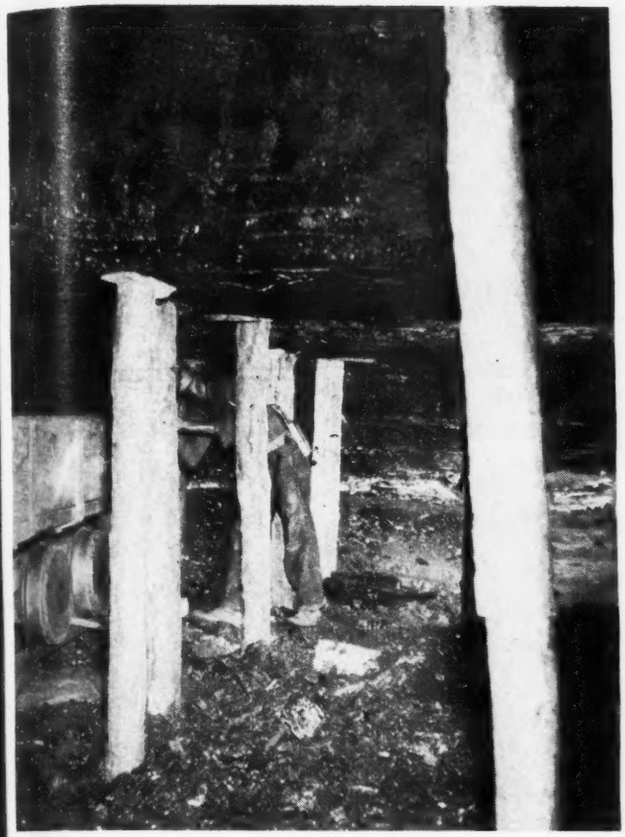
Two cars spotted for loading in a working place. One has been filled from the gray band top coal, here 26 in. thick. Regulation crossbars have been set over the track by the loader after taking down the lift of gray band.

This gray coal of strong structure, without cleavage and without visible impurities, makes an excellent roof. Therefore all advance narrow work in the mine has been driven under the gray band. The part of the seam below the gray band ranges from 5 to 6 ft. in thickness, is fragile and has four ½- to 3-in. partings which the loader attempts to remove and gob at the face but seldom is able to get out more than 70 percent. At the cleaning plant the coal is crushed to 3 in. prior to washing.

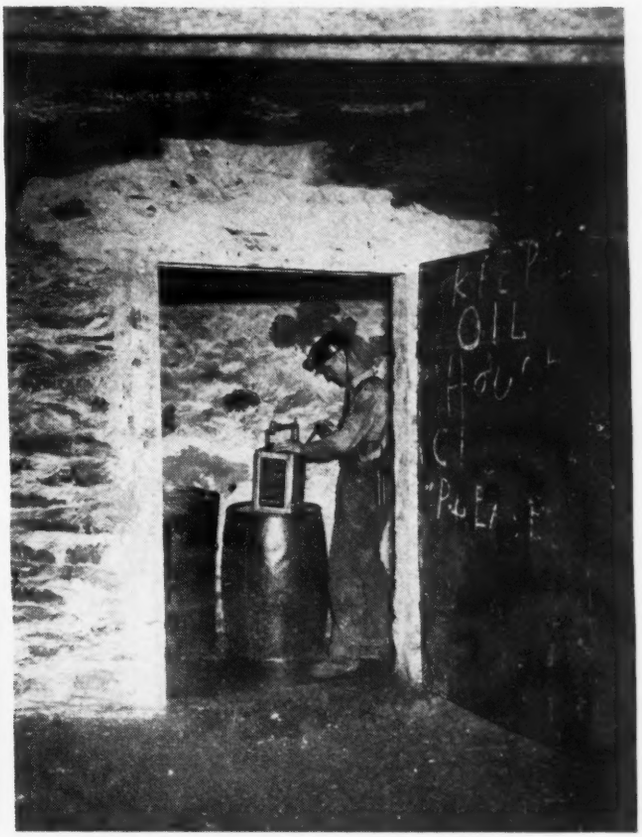
The main slope follows the coal down from the outcrop and was driven about half way between the pitch and the strike, with a resultant grade of 25 percent. Maximum cover in the basin is 500 ft. and the cover over the present workings in the Blue Creek mine is 350 to 475 ft. These workings are now in virgin-coal territory where the pitch is slight. After the panels have been developed and rooms mined to the boundary some pillaring will be done on retreat.

Rooms are 30 ft. wide and 275 ft. deep on centers of 55 to 70 ft. The track is placed in the center of the room and the cars are spotted two at a time at the face by cable-reel locomotives. Cutting is done with Goodman 50-hp. shortwalls (Types 12A and 112AA), drilling with breast augers and shooting with 1¼x7-in. Hercules Red-HB permissible. The lower 5 ft. of coal is mined under the gray band 25 to 30 ft. ahead of the face in the upper 30-in. bench. This provides a good top for cutting and for most of the loading and also affords in a large measure the advantage of two working places at the face of one room.

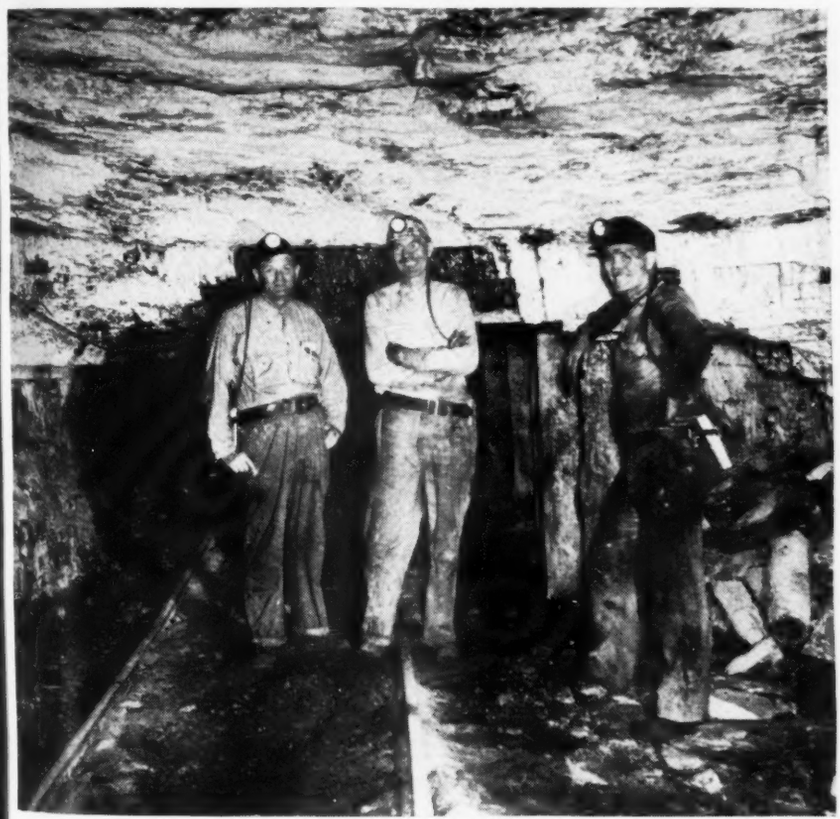
In entries developed by the former operators the top coal was taken down, with the result that, where close tim-



Another view of the working place, where the bottom bench is 66 in. The top coal is posted on 4 ft. centers to 4 ft. of the face.



Fireproof oil house on 4th Left near the main bottom. Rock walls protect the coal; entrance is through a steel door.



Looking inby on 4th Left where the Black Diamond Coal Co. began leaving top coal as a roof. Here, 15 out of a total of 25 in. has been left up. Outby this point, 42 in. of draw-slate has come down. Left to right are J. M. Cardwell, Virgil West and John Cain.

bering was not maintained, as much as 4 ft. of slate came down. The new operators leave all or most of the 2 ft. of this gray-band top coal to achieve a safer condition and effect a large saving in entry timbering.

Roof protection above the room track where the top coal has been taken down consists of 4x8-in. x 10-ft. crossbars on 4-ft. centers. The remainder of the room area is posted on 4-ft. centers both ways. This includes the top coal to within 4 ft. of the face. The mine has been equipped for 1,200 tons per day, two-shift operation. At present the output is 900 tons and the performance is 4.5 tons per man-shift counting all inside and outside men chargeable to production.

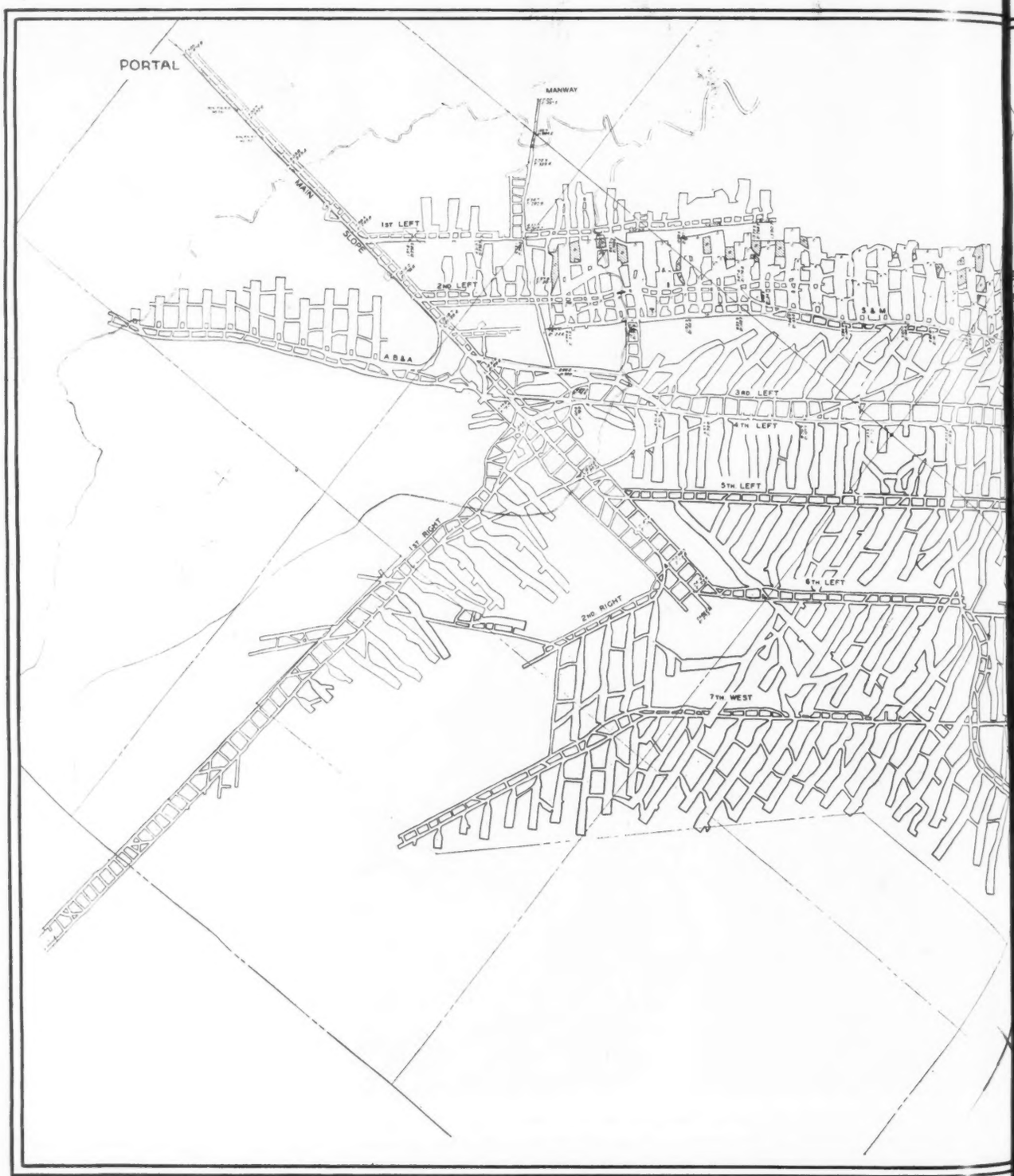
Present locomotive equipment consists of two 10-ton trolley units and three 6- and one 8-ton cable-reel machines. The latter was made by Westinghouse and the other five by General Electric. Rail weight on the main line is 45 lb. D.c. power at 275 volts is supplied by two underground substations, both close to the bottom of the main slope. Each substation is equipped with a 150-kw. conversion unit, in one instance a motor generator and in the other a rotary converter. Two 500,000-cir.mil feeders and a 4/0 trolley wire constitute the

positive leg of the feed circuit. All line materials were purchased from the Ohio Brass Co., also the bonds, which are long-type, arc-welded. Power is purchased at 2,300 volts from the Alabama Power Co.

The bottom, or landing yard, of the 2,000-ft. rope haul on the main slope is on 3d Left adjoining the slope. To this yard, where a Streeter-Amet automatic recording mine-car scale is installed, the main haulage locomotives deliver their trips. The sidetrack, with two cross-overs, has space for 85 loads.

From here, 5-car trips are hoisted in balance over a three-rail track with 180-ft. passing section at the center. This passing section is long enough to accommodate 12-car trips. Rails on the slope are two sizes, 40-lb. and 51-lb. Cars carry 3,600 lb. and are built of wood with solid roller bearings. Total number in use is 193.

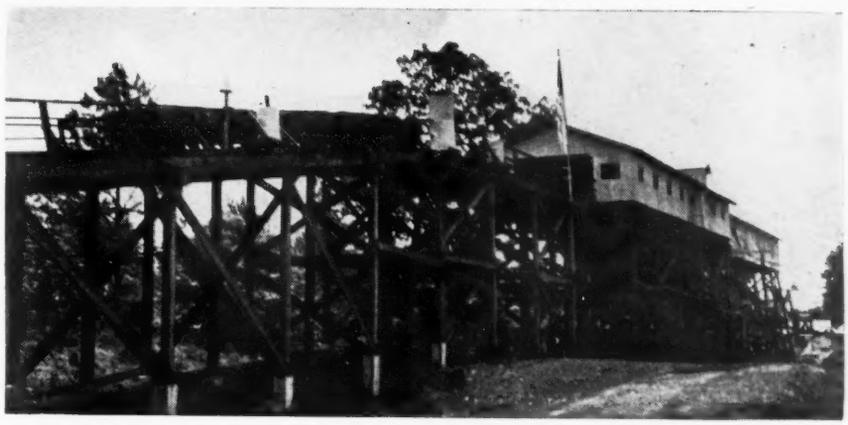
The tipple and the trestle ading up to it are built of creosote pine. Run-of-mine only is loaded, s there are no screens. The mine c s are emptied in two Ramsay single- ar air-driven rotary dumps, making half turn and back. An unusual fea ure of the tipple layout is that the t o railroad tracks, holding a total of 7 empties, are curved starting at the ipple. This avoidance of going straigh back from the tipple saved making n ex-



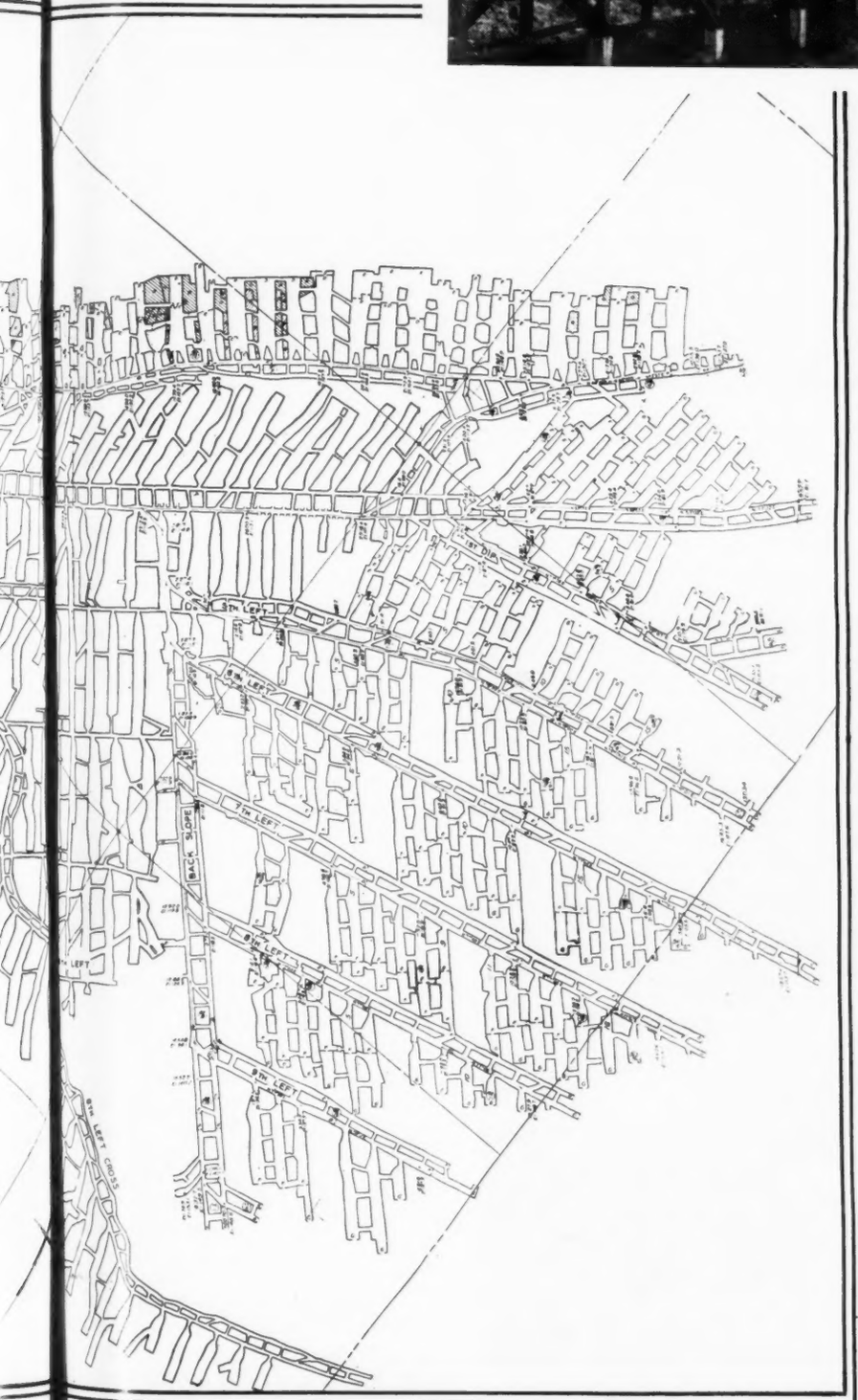
pensive fill in a ravine that would have been encountered.

Hoisting is done by a Hardy-Tynes double drum unit operating with a 1-in. rope and driven by a 200-hp. General Electric induction motor. Incline rollers are Sanford-Day roller-bearing units and the sheaves at the break are built-up units using roller bearings from car wheels.

Soon after the hoist was put into service it was noted that the voltage regulation was poor. To correct this in a sufficient measure and at the same time improve power factor, a 135-kva. capacitor was installed. This equipment, purchased from the General Electric Co., consists of nine 15-kva. 2,300-volt units.



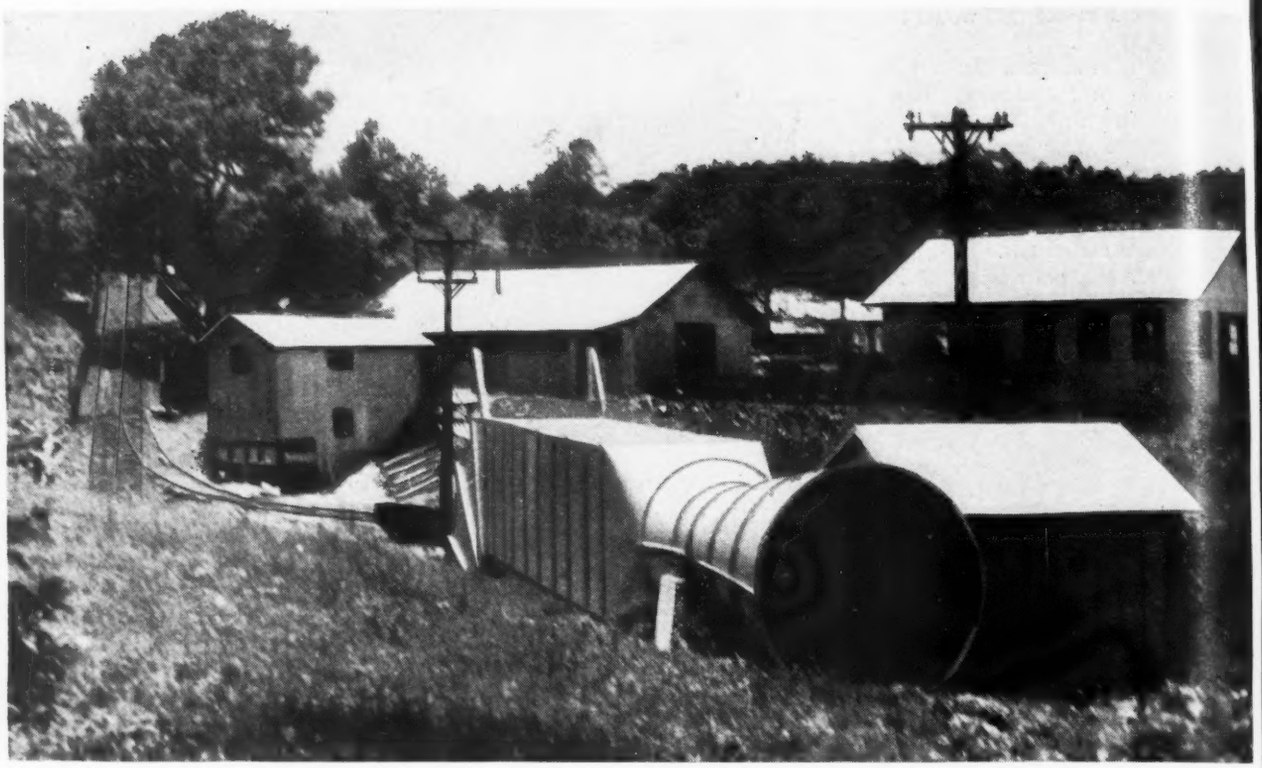
Built of creosoted pine, the new tipple, equipped with two rotary dumps, loads mine-run on two tracks. Water-barrel stations provide fire protection.



Blue Creek workings. All coal is coming at present from 4th Left and 4th Cross ("Back Slope") entries.

The mine fan, which is close to the haulage portal, is a Jeffrey 5-ft. Aerodyne operating exhausting. New surface buildings, besides the tipple, include a modern bath house, warehouse, two shops, sandhouse, general office building including lamp house, superintendent's office and bosses' bath house, and a combination central building 70x70 ft., housing on the ground floor the post office and retail store. In the basement, which is about two-thirds the area of the building, are white and colored lunch rooms, kitchen, and a general meeting room. The main room of the retail store has a balcony across the back for displaying furniture. Viewed from the front door, the meat counter is front right. A door at the left center leads to another room back of the post office which contains the shoe and dry goods departments. All store fixtures are of modern design.

The bath house is a concrete-block structure 30x90 ft. with concrete floors throughout. White and colored dressing rooms equipped with hanging baskets are at the two ends of the building. The center portion is taken up by duplicate shower and toilet rooms for white and colored. Permanence of this building together with the use of treated wood for other



Behind the fan are the three-rail slope tracks up to the tipple, sand house, locomotive and cutter shop, and combination blacksmith and car shop.

Empty tracks were curved starting at the tipple to dodge a ravine.

structures reflect planning for a considerable life. At 1,200 tons per day that life is estimated at 18 years.

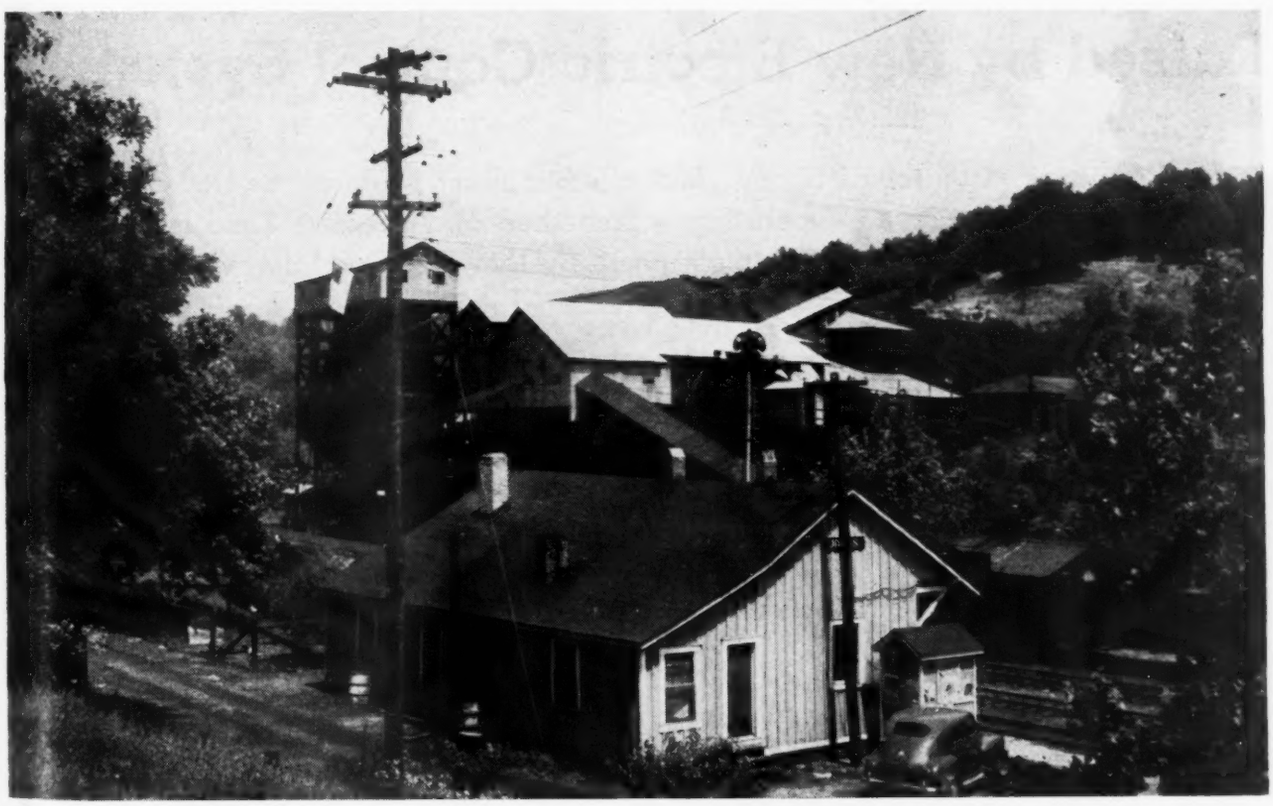
Virgil West is the local superintendent at Blue Creek; J. M. Dickinson is mine foreman and John Cain is chief electrician.

At Johns, 4 miles distant, to which the Blue Creek mine coal is shipped on "in-transit" rate for washing, the preparation-plant capacity is 1,500 tons per day of finished coal, working two shifts. The run-of-mine is passed over a 3-in. screen and the oversize then is broken down in a Jeffrey 36-in. single-roll crusher. Another separation follows and the 3x$\frac{3}{8}$-in. size is washed in three Elmore-type jigs. The $\frac{3}{8}$x0-in. is washed on eight Deister-Overstrom Diagonal-Deck tables. The three sizes usually shipped are 3x0-in. for steam, $\frac{3}{8}$x0-in. for coking and $\frac{3}{4}$x$\frac{3}{8}$-in. for blacksmithing.

J. M. Cardwell is superintendent of the Blue Creek Operations. Johns and Adger mines are on retreat and in both of them all of the coal is coming from pillars only. Sumpter mine is producing from both virgin and pillar territories. Another mine is now being developed near Johns to take the place of Adger, which will be finished in about six months.

The Black Diamond Coal Mining Co. office is at Birmingham. C. S. Bissell is president, C. S. Blair is vice president and general manager, I. W. Miller is general superintendent and J. I. Combs is chief engineer.

Retail store, bath house and, in the background, some of the mine houses at Blue Creek. The store basement includes two lunch rooms, meeting hall and officials' bath house. The main bath house behind the store was built of concrete blocks for permanency. It is divided equally for white and colored.



This illustration was not designed to show the L. & N. station at Johns, Ala., but rather the central preparation plant which washes for the four Black Diamond mines in the Blue Creek basin.

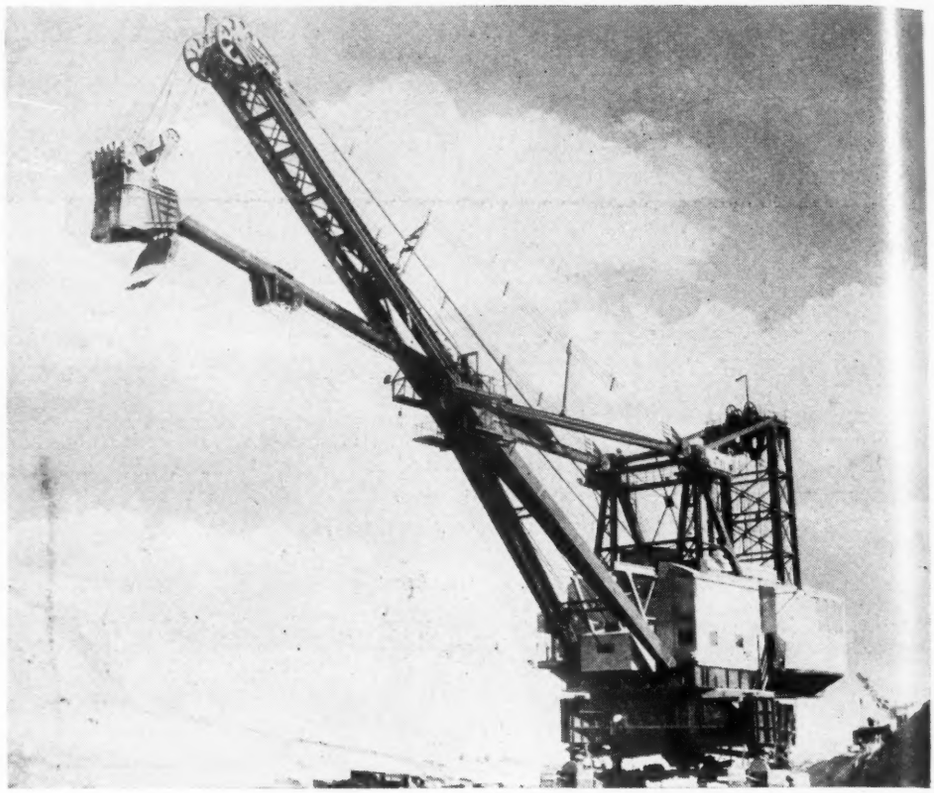


Fig. 1—20-cu.yd. 1,100-ton electric shovel equipped with new control system involving quick-response high-amplification generator for exciting main fields.

SHOVEL PERFORMANCE

Raised by New Electric Control System

Control of Shovel Motions Simplified — Response to Controls Is Improved, Operation Is Smoothed and Digging Time Is Increased With Lower Maintenance — System Also Can Improve Line Voltage

By D. STOETZEL
Mining Section
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General Electric Co.
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ONE OF THE RECENT electrical developments in the shovel industry has been the use of rotating type control. An outstanding example is the amplidyne—a quick-response, high-amplification generator used for exciting the fields of the main generators on shovels. Tests and operating experience with several applications have amply demonstrated that this new control system improves digging characteristics and speeds operation, thus producing substantially increased output.

The amplidyne is a constant-speed d.c. generator which, through the arrangement of field and armature circuits, possesses extremely high speed of response and amplification. This gives it performance characteristics not obtainable with ordinary exciters. The amplidyne usually is driven by an induction motor, the two forming a typical small motor-generator set.

Although the amplidyne is a single machine, as far as external appearance and armature construction are concerned, functionally it is the equivalent of two generators in one—the first acting as an exciter for the second (Fig. 2). The controlling field excites the first machine, the output of which excites the second, from which the final output is collected.

The net result of this excitation arrangement is an amplification as high as 10,000 to 1; that is, 1 watt of control field power will produce a 10-kw. output (Fig. 3). At the same time we may have a rate of voltage response in the neighborhood of 2,000 volts per second; that is, a 125-volt amplidyne builds up to its rated voltage in 1/20 to 1/15 second (Fig. 5).

The amplidyne involves only a very simple and fundamental type of electrical machine. There is nothing to wear out quickly. Small moving or vibrating parts are entirely elimina ed

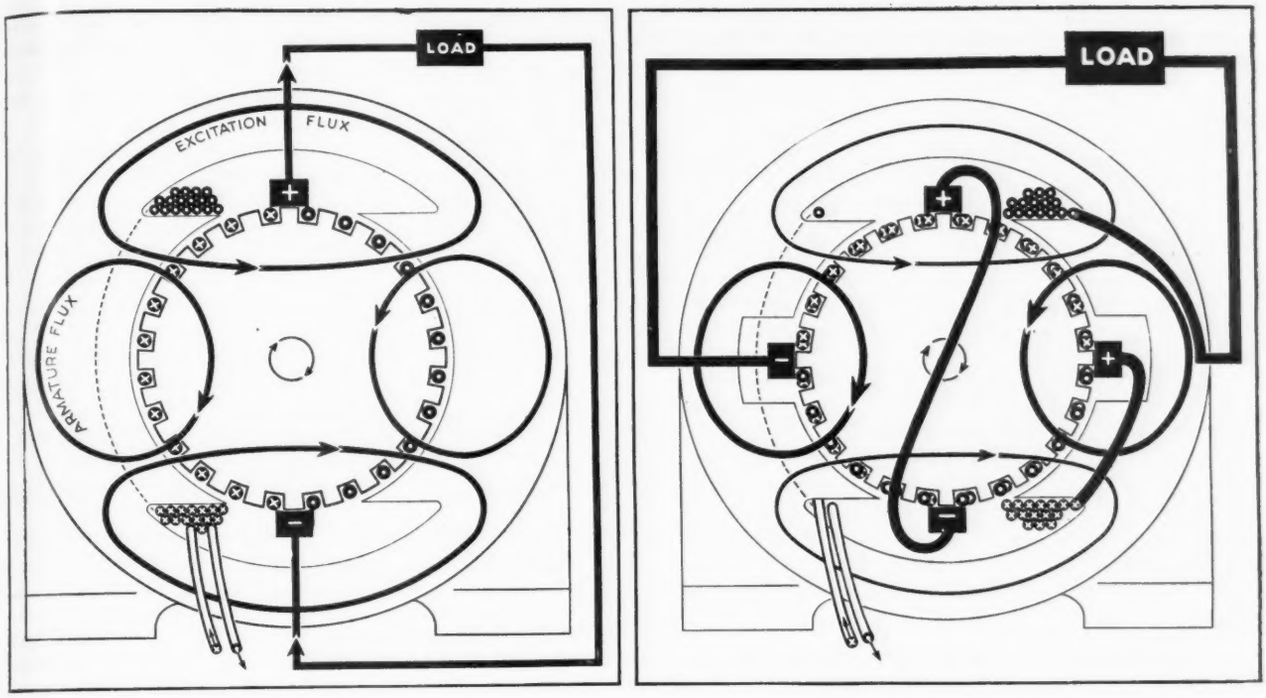


Fig. 2—Left, essential electrical and magnetic circuits of a conventional d.c. generator; right, same circuits for amplidyne.

and the machine is capable of withstanding unusual conditions of dust, dirt, vibration and rough handling. The use of multiple fields in the amplidyne greatly reduces the number and size of control devices required to obtain desired performance. A large degree of simplification has been accomplished in nearly every application of the amplidyne.

Because the excitation requirements are so small, the amplidyne adjustments may be extended over a wide range. Considerable flexibility thus is built into the equipment, which allows operating limits to be changed easily when conditions require it. Similarly, the characteristics of the drive may be changed, if required.

When machines operate on a rapidly changing cycle, their transient performance characteristics often are less desirable than their steady state characteristics. The forcing action of the amplidyne makes these machines follow closely the designed characteristics so that they deliver maximum performance, even under fast changing conditions. Because the performance characteristics are built in as part of the system, the amplidyne continues to adhere to these characteristics year after year, giving the operator full assurance of unfailing performance.

Shovel Applications

The scheme used on electric shovels provides a combination of multi-point manual reversing control with voltage

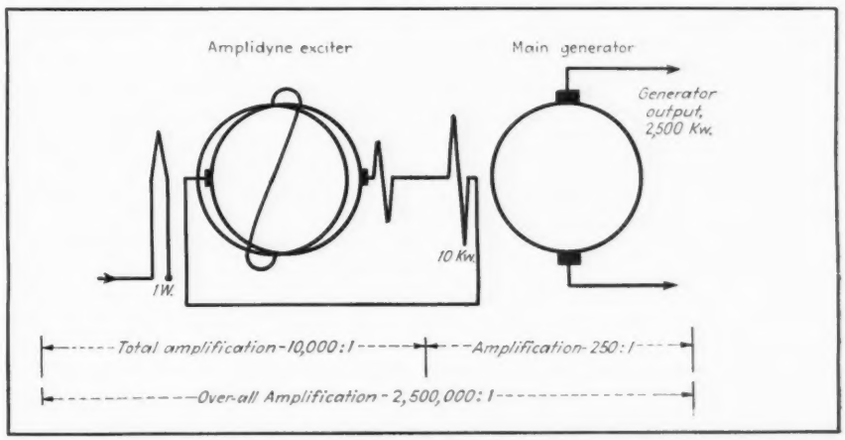


Fig. 3—Diagrammatic sketch of power control showing high amplidyne amplification.

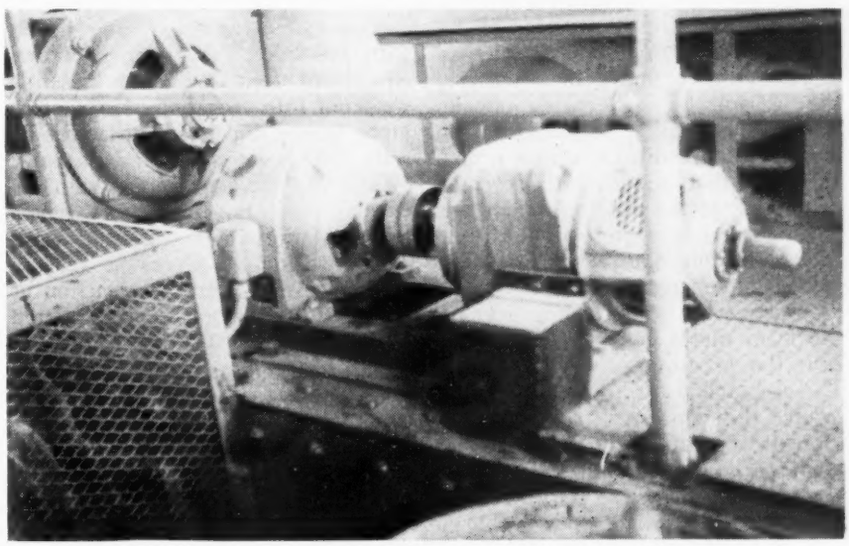


Fig. 4—Amplidyne motor-generator set of the type employed on shovels.

control and current limit. As in any large electric shovel control, the operator has a five- or more point reversing master switch for each motion. In the case of the amplidyne control, this switch is extremely light and easily operated, at the same time providing great sturdiness and mechanical strength. The volt-ampere generator characteristics provided by the amplidyne control are distinctly superior to those produced by the conventional three-field variable-voltage control (Fig. 6).

Better Control of Plugging

The small amount of control power involved makes it possible to use various rectifier and resistor connections to obtain unusual and desirable characteristics in the regenerative quadrant, thereby providing control of plugging peaks within limits not heretofore attainable. It is desirable to keep the maximum net force at the load the same on regeneration or plugging as on motoring. It will be noted (Fig. 6) that the amplidyne control gives more power in the motoring quadrant where friction opposes, and less power in the regenerative quadrant where friction favors, particularly at the higher voltages and speeds. This protects the mechanical and electrical parts from excessive current and torque peaks.

The electrical connections for the shovel amplidyne control, providing the characteristics outlined, are simple and readily comprehended (Fig. 7). They involve a minimum number of circuits, with fully adjustable features. Practically all of the adjustments are obtained by means of control circuit resistors, with means for quickly varying the resistance. The circuits are arranged so that possible loss of contact at any adjustable resistor would reduce rather than increase the power applied. Back-up protection is provided by an extremely fast-acting overcurrent relay.

The primary source of control is the 125-volt "house" exciter circuit. To use the simplest possible form of master switch, a divider resistor is provided, so that power to the control field is fed to the circuit through the 5-point reversing master without using reversing connections. A current-limit field circuit, energized from the voltage drop across the commutating field of the main motor and generator, regulates the maximum current applied. This is matched against a bias voltage, secured through a small control transformer and rectifier. The function is to hold off the current-limit action until a point is reached close to the desired maximum current.

A standard anti-hunt or stabilizing field connection is used on the amplidyne, utilizing a capacitor rather than a transformer, because of the simpler connection. The compensating field on the amplidyne is provided with means for a certain amount of shunting, which gives control of the volt-ampere characteristics, and thus control of the maximum field strength impressed on the main generator. A feed-back connection from the output circuit to the current-limit field circuit is employed to oppose the current-limit action to a certain degree, thus giving the system any desired amount of self-energizing characteristics.

One of the important points in connection with electric shovel control is provision for neutralizing, or "suicide" action. For flexibility and accurate control, this is provided in two places. There is a neutralizing connection in the anti-hunt field circuit, and another, which prevents creeping, in the current-limit field circuit.

The master switches, resistors, capacitors and transformers involved in this system may be of very small rating and size—limited only by mechanical considerations necessary to obtain the strong, substantial construction required in any device applied to shovel service. These devices, as grouped on the control panel, are easily handled, and connections may be changed quickly and easily. This provides for ready adjustment, easy operation, reduction in space requirements in the control cabinet and ready accessibility.

Operating Experience

Amplidyne control, after preliminary field tests, was applied to the hoist motion of a large electric stripping shovel early in 1940, and demonstrated an improvement of approximately 7 percent in output over a considerable period of time. On one of the world's largest shovels, the 35-cu.yd. Marion 5561 coal stripper of the Midland Electrical Coal Corp., Middle Grove, Ill., complete amplidyne control equipment for all motions was put into operation early in 1941. The satisfactory results brought up the desirability of changing existing machines with conventional control to the new amplidyne control. This matter is being given careful study, and it seems likely that for certain individual cases and conditions, at least, substitution of the new type control for present control equipment will be warranted.

All Motions Controlled

Two more large coal-mining shovels with complete amplidyne control equipment for all motions recently were put into operation at a western mine, with particularly satisfactory results. One is an extremely long range 1050-B Bucyrus-Erie stripper with 20-cu.yd. dipper (Fig. 1). The other is a rebuilt Marion 350-E coal loader with a 15-cu.yd. dipper. Operators and engineers have expressed satisfaction at the unusually smooth, speedy action of these machines. While it is too early to look for definite output records, preliminary surveys indicate that the machines will handle unusually large quantities of material.

Tests recently made on large stripping shovels indicate definitely the advantages of the newly developed amplidyne control over the conventional variable-voltage control usually applied. A 5- to 7-percent over-all gain in speed of operation and smoother and more continuous application of power is indicated by the records obtained. It is anticipated that the smoothness of operation will result in a considerable decrease in electrical as well as mechanical maintenance with correspondingly increased production.

These tests were made over a period of a week and involved operations on two 35-cu.yd. and one 30-cu.yd. Marion Type 5561 shovels. Approximately 50 oscillograph records were made with a seven-element oscillograph. This permitted recording generator field conditions simultaneously with armature circuit and speed conditions.

The oscillograms, which vary in length from 10 to 15 ft., with time periods of from 30 seconds to 3 minutes, cover "staged" tests of various kinds in addition to regular digging operations. The machines on which tests were made are as follows:

1. A 30-cu.yd. coal-stripping shovel with conventional variable voltage control with fast (25 percent voltage) fields and magnetic control for field circuits.

2. A 35-cu.yd. coal-stripping shovel with conventional variable voltage control with the usual (50 percent voltage) fields and magnetic control for field circuits.

3. A 35-cu.yd. coal-stripping shovel with amplidyne control.

Notwithstanding that the first shovel listed has a 30-cu.yd. dipper while the other two machines have 35-cu.yd. dippers, the load conditions are equivalent on the three machines and the electric equipments are essentially duplicates. The lengths of booms and dipper sticks, gear ratios and speeds of

operation have all been designed and adjusted so that the duty on the electric equipment is practically the same in all cases.

Records were taken to show the relative speed of response of the various shovel motions under no-load, light-load and maximum-load conditions. Some of the charts indicate the relative speed of response and fidelity to the design characteristics under the rapidly varying conditions of shovel operations. Another group shows graphically the smoothness of operation accomplished by the amplidyne control.

Representative sections of the charts have been studied and replotted, and are shown here with pertinent comments:

1. A typical section of oscillogram taken on an electric shovel is given in Fig. 9. This shows all elements of the oscillograph in use. Here are recorded the variations in speed, voltage and current, as well as the variations in field conditions, encountered in going from hoisting to lowering the regular operation.

2. Fig. 10 shows operation in going from full-speed lowering to maximum-speed hoisting by plugging the controller hard over. Here the response of the amplidyne-controlled equipment is shown to be much better than that of the conventional type equipment under the heavy load conditions.

3. Fig. 11 shows the volt-ampere conditions for a staged test involving starting from rest, hoisting the loaded dipper to a fairly good height, plugging to lower, lowering at maximum speed to somewhere near the starting point, and then plugging to rest and starting again in the "up" direction. Fig. 11 applies to this cycle of operation for the conventional type equipment with the fast fields, and Fig. 12 is the same thing for the amplidyne-controlled equipment. The relative smoothness and effectiveness of the application of power is indicated by the general shape of these volt-ampere curves. The power peaks on plugging are indicated. The sharp angles and the relatively violent changes in current values shown in Fig. 11 as compared to those shown in Fig. 12 are an indication of the greater smoothness and stability of the amplidyne-controlled equipment in operation.

4. Figs. 13 and 14 show the volt-ampere conditions for the conventional equipment and the amplidyne-controlled equipment respectively for a complete swing cycle starting in one direction from rest, going to maximum speed, plugging to stop, building up to maximum speed in the opposite direction, plugging to rest and starting again in the original direction. It will be

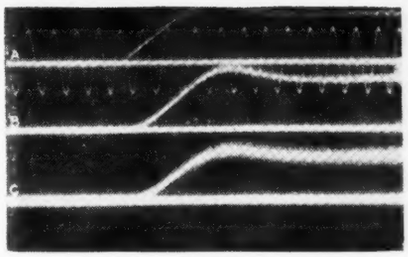


Fig. 5—Rate of rise of amplidyne voltage as shown by oscillograph: *A*, control-field current, 60-cycle timing wave; *B*, short-circuit axis current; *C*, load voltage.

Fig. 8 (Right)—Amplidyne control panel for shovel crowd motion.

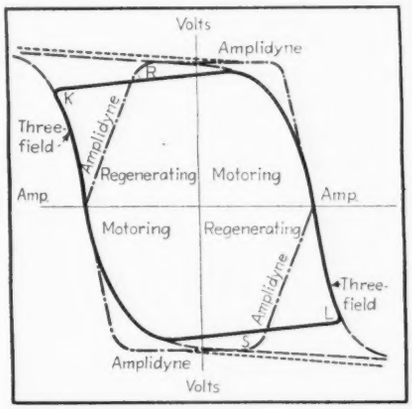


Fig. 6—Volt-amp. characteristics of three-field and amplidyne-controlled generators.

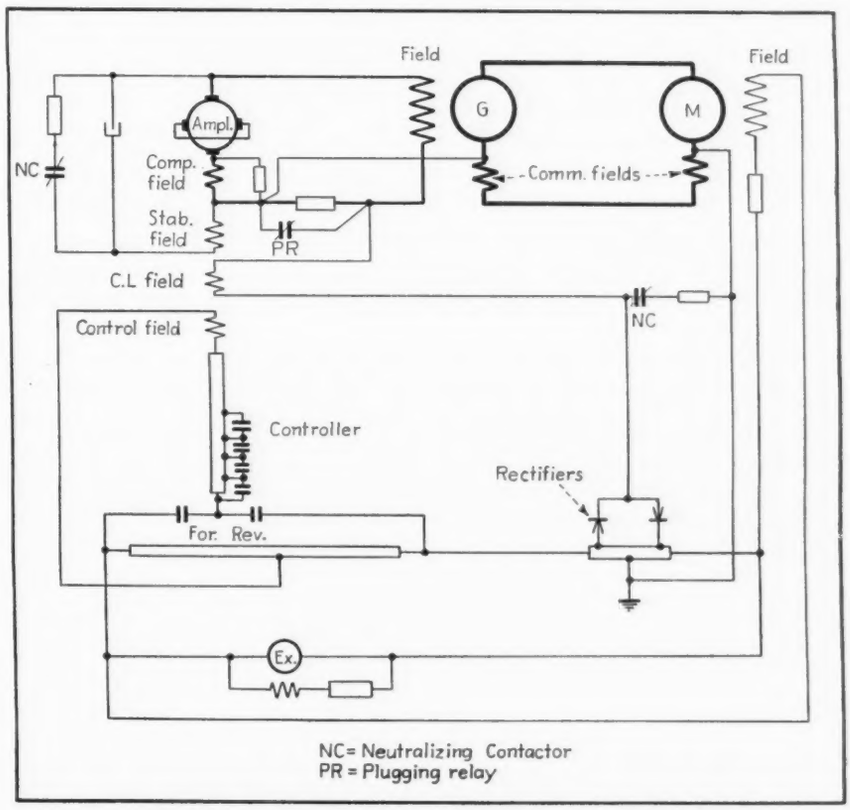


Fig. 7—Schematic diagram of amplidyne control for electric shovels.

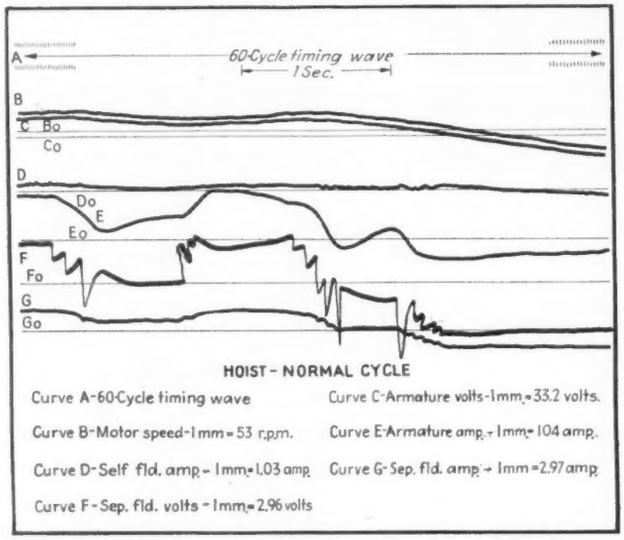


Fig. 9—Typical section of operating oscillogram taken on electric shovel.

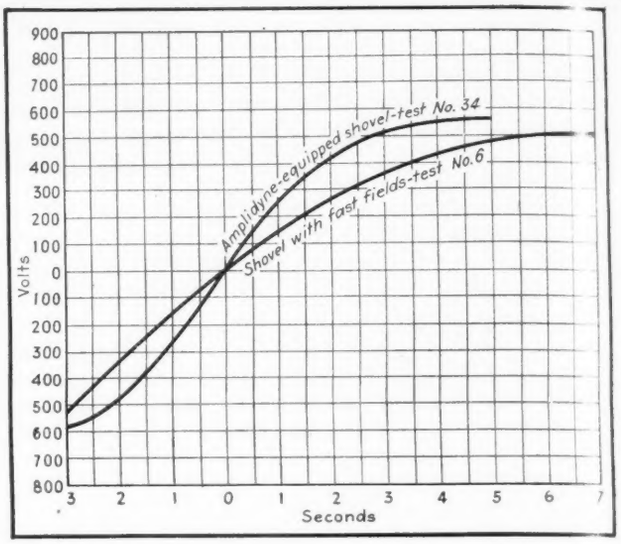


Fig. 10—Generator performance curve—hoist motion with loaded dipper.

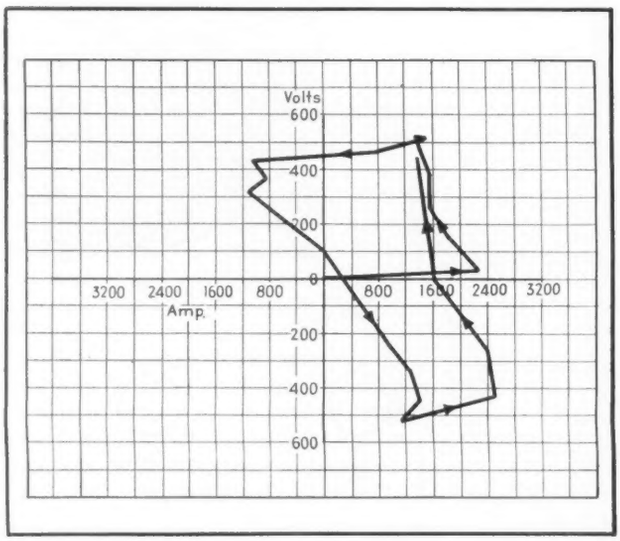


Fig. 11—Generator performance curve—hoist motion with loaded dipper (staged test with conventional control).

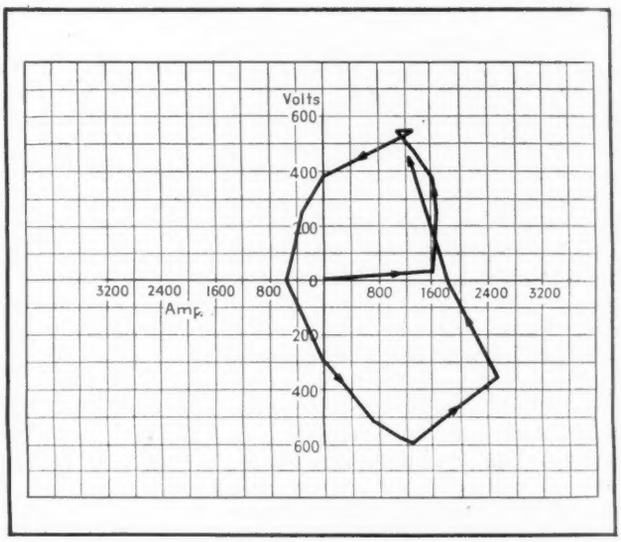


Fig. 12—Generator performance curve—hoist motion with loaded dipper (staged test with amplidyne control).

noted that on the amplidyne-controlled equipment the current holds up better on acceleration, which means faster acceleration. On plugging there is plenty of retarding current or torque with the amplidyne equipment, but building up to the maximum is smoother and more gradual than on the conventional-type equipment. This results in smoother operation and less mechanical stresses and shocks on the equipment with the amplidyne control.

It will be noted that the Y-Y axis of the envelope of the volt-ampere characteristics of the equipment with the amplidyne control is practically vertical, whereas the corresponding axis for the conventional equipment is tipped 30 deg. or more to the left at the top. A consideration of the mechanical requirements of the swing motion on a shovel indicates the desirability of maintaining this Y-Y axis in a vertical position or having it tilt slightly to the right at the top. This results in maximum speed of operation with definitely limited mechanical stresses.

Equally Effective on Crowd

Tests on the crowd motion were not extensive. For this motion, the same general comments made regarding the stability, smoothness of operation and kilowatt peaks for the hoist and swing motions apply.

Fig. 15 shows the increased rate of acceleration (speed vs. time) under fully loaded conditions for the hoist motion. It is estimated that a gain of approximately 1½ seconds in each 50-second cycle—that is, a 3 percent increase in speed—will result. This faster acceleration is produced by a more sustained application of power, and not by increasing the maximum torque applied at the motor shaft. As a matter of fact, both the power and torque peaks with the amplidyne control are appreciably lower than with the conventional control equipment.

Fig. 16 shows the time/speed characteristics when going from full-speed lowering to full-speed hoisting by plug-

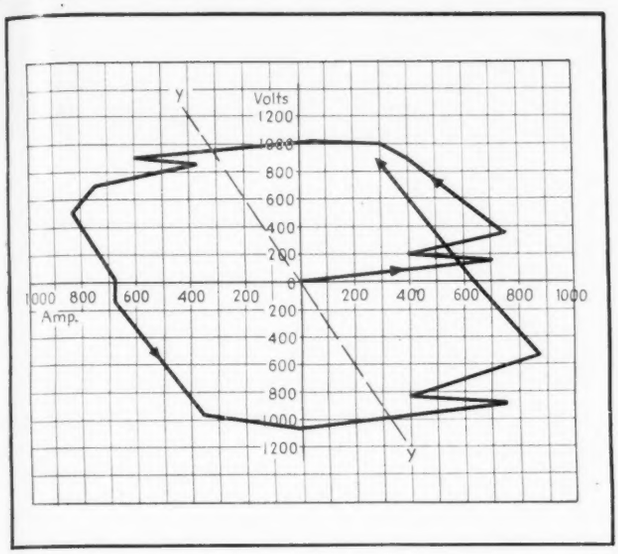


Fig. 13—Generator performance curve—swing motion with loaded dipper, three-field control.

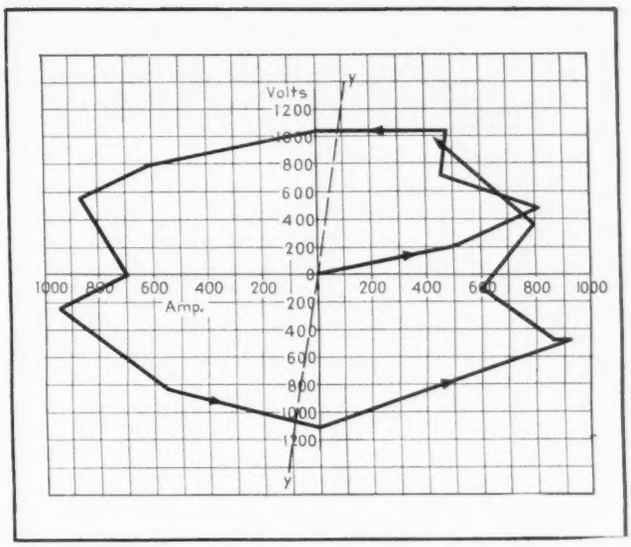


Fig. 14—Generator performance curve—swing motion with loaded dipper, amplidyne control.

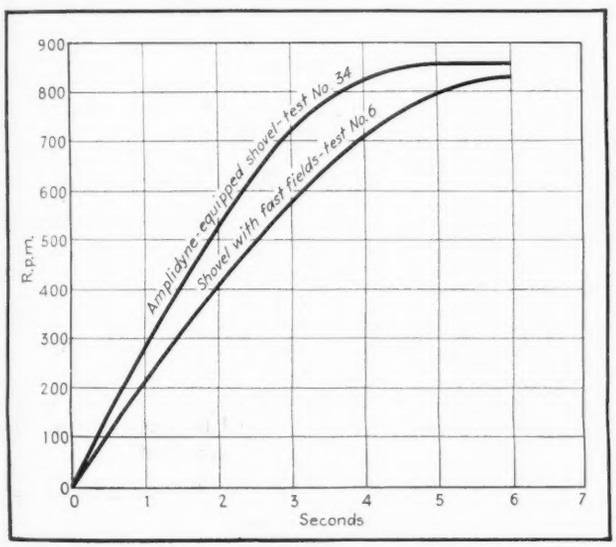


Fig. 15—Time-speed curves for amplidyne and conventional controls when hoisting with full load.

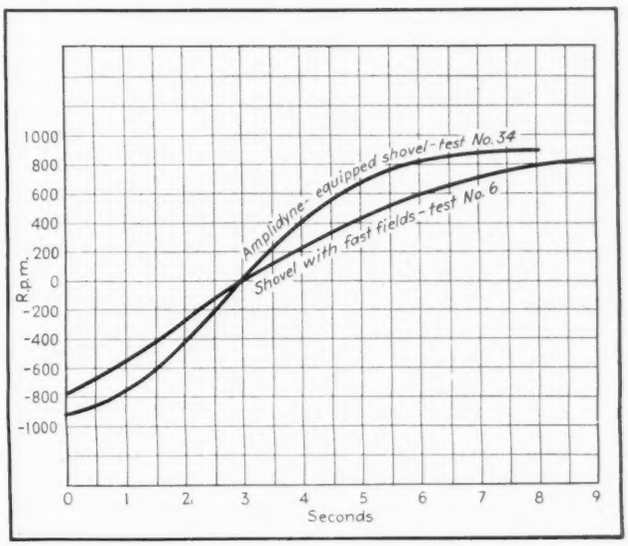


Fig. 16—Time-speed comparison when going from full speed lowering to full speed hoisting by plugging.

ging the controller hard over. This indicates a time saving of approximately 3 seconds out of 8 for this part of the operating cycle—that is, time to change from full-speed lowering to full-speed hoisting.

It should be noted that these are not all pure gains in cycle time. In order to cover the same total distance it will be necessary for the machine with the faster acceleration to run somewhat longer at top speed. The area between the curves is a saving in cycle time. Its relation to the total time multiplied by the speed area required for the particular operating cycle under consideration must be taken into account. The longer the period of full-speed running the less the importance of the gain in acceleration.

Gain 5 to 7 Percent

The hoist must accelerate from rest to somewhere near full speed one to three times each cycle. Also, it is required to decelerate from full-speed lowering and go to normal hoisting speed once each cycle. On this basis, it is conservatively estimated that an average gain of 5 to 7 percent in total cycle time will result from the use of the amplidyne control which produces the improvements in acceleration shown in Figs. 15 and 16.

The ampere/time data indicate a definitely smoother application of power in the case of amplidyne control. Instead of a large number of jagged current peaks, there is a relatively smooth current curve with only a few well-sustained peaks on the amplidyne-equipped shovel. Plugging peaks are rounded off, and maximum current occurs at a much lower voltage, which results in maximum torque at a lower speed—a condition beneficial to both the mechanical and electrical parts.

It is reasonable to assume that smoother application of torque at the motor shaft will result in decreased maintenance, both mechanical and electrical. The control of high current peaks on plugging to permit these

peaks to occur only at a relatively low voltage will benefit both motor and generator commutation, which again results in a decrease in maintenance. Experience with all kinds of shovels has shown that suddenly occurring torque peaks at any point in the cycle and on any motion invariably result in increased maintenance. Elimination of these peaks means reduction of maintenance.

It is obivous that any decrease in the cycle time which is not made at the expense of the load carried will result in increased over-all output of the machine. A reduction in maintenance will mean more continuous operation, and with this supplementing the increased speed of operation, a definite and appreciable increase in output must occur.

More Work Accomplished

A study of the oscillograms shows that the conventional equipment, with extra fast fields (20 to 25 percent voltage fields with large external resistance), gives faster open-circuit armature voltage build-up than does the amplidyne equipment, which does not provide so great a degree of field forcing. Yet, on account of the amplidyne-controlled equipment's stability, high speed at normal loads, and elimination of unnecessary peaks and valleys, the speed of response under working conditions and the work actually accomplished in a given period of time is greater. The conventional equipment with normal fields (50 percent voltage fields) has an open-circuit armature voltage response factor not quite as good as that of the amplidyne, and produces about the same peaks as the equipment with the extra fast fields. Under load conditions, its response is relatively slow.

It should be borne in mind that almost any desired degree of field forcing may be obtained with the amplidyne equipment by increasing the voltage (and consequently the kilowatt rating) of the amplidyne exciter and adjusting the characteristics to apply high voltage to the generator fields whenever speed of voltage build-up is required; or simply by using resistance in the main field circuit to reduce the L/R factor with correspondingly faster generator response.

While not the subject of these tests, it was noted from observation and comments of operators that the amplidyne equipment is much more readily adjustable than the conventional three-field equipment, and the volt-ampere or speed/torque characteristics are very flexible—that is, they may be adjusted over a wide range to meet closely all of the different conditions which may be encountered in various kinds of operation. Another point which has been the subject of favorable comment is that the maintenance of the control has been reduced to practically nil on the amplidyne equipment.

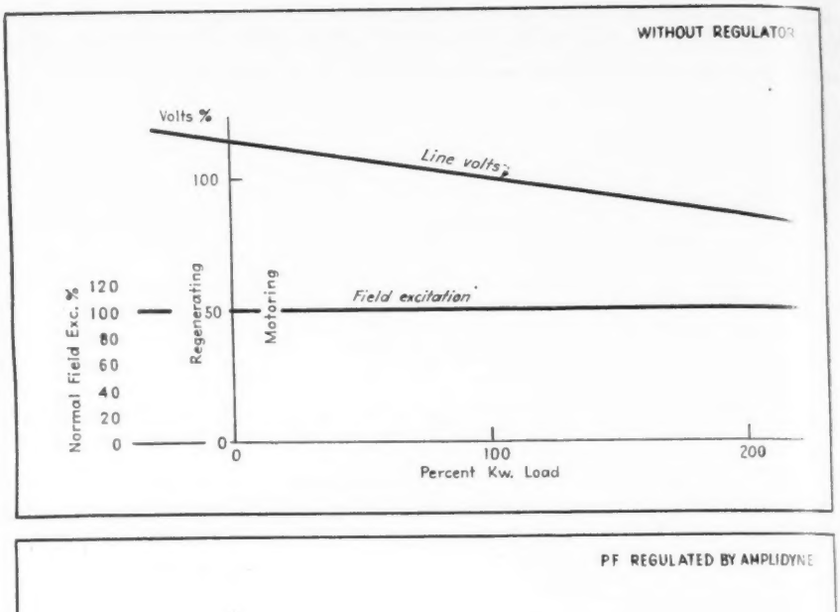
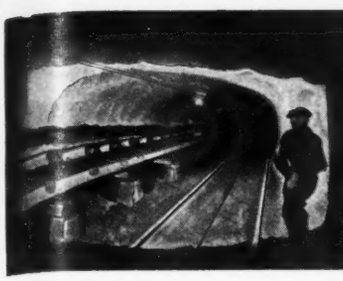


Fig. 17—Effect of power-factor regulation on power-line voltage conditions.

Power-Factor Regulation

Any discussion of the use of the amplidyne on electric shovels would be incomplete without mention of the use of this versatile device as a power-factor regulator on large machines where a synchronous motor is used to drive the motor-generator set. An amplidyne exciter may be operated as a buck-and-boost generator in series with the synchronous motor field across the constant-voltage exciter. It is possible, by means of suitable connections of amplidyne control fields, to regulate for unity power factor, or desired varying power factor, throughout the range of loads encountered. For example, an arrangement providing lagging kilovolt-amperes at no-load and increasingly leading kilovolt amperes as the maximum load is approached, will benefit power-line voltage conditions.

Under the load changes usually encountered in shovel service and the conditions on the average power line supplying power to large electric shovels, it will be found that voltage regulations will be very materially improved by the use of a power-factor regulator of this kind (Fig. 17). A recent test demonstrated approximately 70 percent reduction in line-voltage fluctuations by the use of the amplidyne power-factor regulator. At a western mining operation, it was found possible to keep seven large shovels and draglines in full operation on a line which would handle only about half that load if the power-factor regulators had not been used to improve voltage conditions.



THE FOREMEN'S FORUM

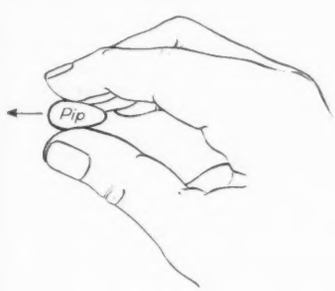
Compare Mine Bursts To Schooboy's Prank

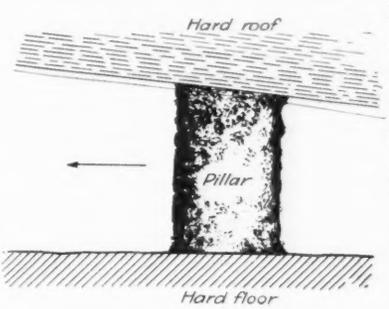
Some mining men in Kentucky are of the opinion that the sudden bursts which throw out pillars and bury men in friable dust are produced in a manner similar to the projection of an orange pip or cherry stone by a schoolboy. He presses the object with his finger and thumb, and it flies out—to the consternation of one of his fellows. The hard roof rock and hard floor rock in the Kentucky mines form a wedge as the coal thins, let us say, to the right and they project the pillar with violence to the left, but neither roof and floor need approach appreciably in the process.

Bumps and bursts, however, are of many different kinds. Those in one region or in one section of a mine may vary from those in another region or section. All that seems to be universal is depth, rock hardness and suddenness. This, however, does not apply to gas bursts. The structural burst or bump is sudden because some strong stratum long under some stress and at last overstressed suddenly gives way, thus bringing so severe a stress on a more readily collapsible material—in this case, coal—that it is unable to resist.

The Cassidy outbursts in British Columbia, described in Coal Age, March 29, 1923, do not seem to have had this tendency as causation, though the thickness of the bed is said to have varied from 1 to 30 ft., and the bed thickness in general was quite erratic. The outburst always appeared at the face and the management believed that no relation could be established between outbursts of gas and the "rolly barriers" found in the mine. In one case 1,200,000 cu. ft. of gas was discharged, and in 160 outbursts the quantity of displaced coal varied from 50 to 1,500 tons per outburst. The immediate roof was of shale and 106 ft. thick, and the floor also was of shale, so in this instance there was no rock or floor hardness, and the bursts commenced when the depth was only 800 ft., despite the fact that only narrow work with generous pillars was attempted.

In the largest outburst, part of the coal travelled toward the thicker part of the seam in the Kentucky manner but part needled its way through a narrow path in which the coal thickness dwindled from 10 to 4½ ft. and then increased in thickness to 8 and 9 ft. The coal was quite loose, however, and perhaps the solid front was squeezed out in the Kentucky manner, and the coal, being loose behind it, blew out along its lines of weakness. Conjecture seems as hopeless as the management suggests. One wonders, however, why the barrier which held the gas in place so stoutly was so suddenly and completely destroyed.





Coal between two hard rocks, with bedding planes inclined toward each other, by reason of change in thickness, flies in direction of wider opening.

Should Not Discount Rarer Explosive Gases

It has been stated that ethane, propane and heavier hydrocarbons have been found in the air of coal mines, but that both in the United States and Great Britain the testing of the safety of safety lamps, explosives and electrical machinery has been conducted in the presence of manufactured gas having percentages of this same ethane and presumably other heavier hydrocarbons. This latter fact is heartening and reassuring, but the gas which is used in this testing comes to the laboratory or gallery in a small pipeline; it has no opportunity to segregate, and in the mine such opportunities exist at least occasionally. Ethane is nearly twice as heavy as methane, propane is almost three times as heavy and the butane is not quite four times. The specific gravities of methane, ethane, propane and butane are, respectively, 0.5534, 1.0371, 1.5210 and 2.0047, with pentane, hexane, heptane and octane actually liquid.

Liquid hydrocarbons sometimes are found running down props, so perhaps the heavier gaseous hydrocarbons are an occasional menace and their liquid associates also, especially in low places where the methane can rise and the heavier gases fall. However, the paraffin liquids on the props could not have segregated from gases or they would be found only near or on the floor. Such liquids must have oozed out of the roof, being perhaps derived from torbanite deposits.

There may also be physiological differences between the gases which may account for occasions in which men overcome by gas have become violent and in early years were thought to have been victims of obsessions of evil spirits. Moreover, the presence of these gases may explain the "quick gas" that suddenly fills a lamp with flame, for such gases ignite when even very low percentages of them are present.

What Pump and Motor Will Be Needed Here?

Q.—The water lift at a shaft is 550 ft. and the quantity of water to be pumped is 5,200 g.p.m. The pump has an efficiency of 84 percent. What will be the horsepower of the pump and what size of motor should be provided? How many amperes would be needed, assuming a power factor of 85 and a voltage of 2,300?

A.—Energy is figured in foot-pounds, in heat generated or in volt-amperes. In this case evidently the calculation will be in foot-pounds, and the first part of the answer is obtained by multiplying the weight of the water in pounds by the distance in feet it is lifted vertically as measured from the upper surface of the liquid in the sump when the water is at its lowest anticipated level to the level of the point of discharge, in which calculation we shall be disregarding the friction of the water on the pipe, the energy of movement still in it when it emerges from the end of the pipe, and the inefficiencies of the pumping unit.

The water raised is 5,200 g.p.m., the weight of which is 5,200x8.3268 lb. = 43,299 lb., for 1 gal. weighs about 8.3268 lb. at 62 deg. F., which is about mine temperature. Suppose we say 44,000 lb., for the water is heavy with impurity whereas the figure we have taken for weight of water is that of a pure liquid. It has to be raised 550 ft., so, disregarding pipe friction and the speed at which the water is compelled to travel, the energy demand would be 550x44,000 ft.-lb. per minute = 24,200,000 ft.-lb. There are 33,000 ft.-lb.

in a horsepower, so divide 24,200,000 ft.-lb. by 33,000 and you have the horsepower in the water, or 733 hp.

This demands a large pump, and we will assume it to be a modern one. It may be safe therefore to figure on an efficiency of 84 percent, provided that the pump is designed for about the lift designated, so the horsepower should be $100 \div 84 \times 733 = 872$. The electric motor may be expected to have a full-voltage current, as the pump doubtless is near the generating or receiving station, so it should have a 92-percent efficiency. The horsepower of the motor: $100 \div 92 \times 872 = 948$. A 1,000-hp. motor should suffice.

A horsepower equals 0.746 kilowatt, so the motor would have to develop 746 kw. But at 85-percent power factor that would be $100 \div 85 \times 746 = 878$ kilovolt-amperes. Assuming 2,300-volt current, then $2{,}300 \times \text{amperage} = 878{,}000$ volt-amperes. Thus the amperage is $878{,}000 \div 2{,}300 = 382$ amp.

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Always Drive Your Methane Uphill

It has been ascertained that when methane is liberated at the foot of an incline dipping 1 ft. in 10, or 10 percent, some of the gas will travel up the incline even if air is passing down the incline at a speed of 80 ft. per minute. From this it appears that air traveling at that speed will not be able to drive methane down a 10-percent gradient satisfactorily.

Unfortunately, no tests have been made to ascertain the air speed necessary to compel methane to travel down various gradients, but, assuming that the velocity of the air that can be opposed by the methane increases and decreases in proportion to the gradient, some useful figures have been obtained, which have been embodied in the accompanying table.

However, it always is a good plan to ascertain whether assumptions can be carried so far as to result in absurdity, as thereby one can find out if they are invalid. According to the assumption, if the gradient is level, or 0 percent, the methane will not travel even if there is no current at all to oppose, which is what we well know already to be absolutely true, except for diffusion, but if the place is vertical or pitching at 90 deg., the gradient will be infinite and by this calculation it would take an infinite current to keep the methane down, which suggests that the assumption made may be in error. However, it has its value if not taken to extravagant limits.

It will be abundantly evident that air when it contains methane should be taken always uphill as far as possible and that it will be difficult to drive methane down and out of rising rooms, yet rooms nearly always are driven to the rise, and the methane accordingly, as the room is advancing, has to be removed downhill. It is evident that "bleeders"—crosscuts from the room faces to the return heading of the entry above—can do a most effective job in removing methane, but, unfortunately, they cannot be constructed until the room is completed, and their real value is for the ventilation of the room when the pillars are being drawn.

Air that goes over the top of a fall has to descend on the other side, often on an inclination over 20 deg., and it is little wonder that it refuses to go down to the bleeder beyond and remains in the long elliptical dome formed by the falls parallel to the "breakline." (By the way, what is the "breakline"—the summit line of the fall or the edge of the break?)

Visualizing the buoyant methane trying to get down from high spots to low ones will rid the foreman of the notion that his air is doing a good job. He may find 1 percent of methane along the line of pillar prominences and have back of it twice that concentration of methane, especially if the dome is high, as it often is before the roof finally breaches to the surface and real subsidence occurs. And when it does occur that methane will be driven to the line of pillar prominences where men are working and even beyond it. Moreover, it is questionable whether the tabular figures would apply to so large an open and irregular space as the goaf, where whirling currents are so easily established.

Foremen should know more about the speed and distribution of the air travel in their rooms. They should station themselves in the return air from a shot and take the time of the blast and then note how soon the smoke reaches the point where they are stationed, and thus get an idea how speedy is the air current. Its tardiness may surprise them, unless they have auxiliary ventilation. A tin tetrachloride candle will give a better guide, because a shot not only makes smoke but provides a high temperature. This produces an atmospheric pressure that will drive the return air forward and slow the intake air of the working place, and thus make the determination not quite as exact as might be wished. Watching smoke from shots, its speed, its direction of travel, its penetration of corners and the length of stay at the face is a most profitable way of getting a conception of the efficiency of ventilation and of the laws by which it is governed.

ALSO FOR FOREMEN

Highly practical suggestions for mine foremen regarding their old enemy, falls of roof, and how to prevent them may be found in the report of the meeting of the National Safety Congress on page 114. Foreman training is discussed on p. 71. The foreman's education heretofore has been mostly in safety, but he and all his aids are likely from now on to be given industrial as well as safety training. The war has given the industry a new slant. Every man will have to supplement 'sperience with book learning. He is as much entitled to it as the doctor, the electrician or the mechanical engineer.

Suppose you have only one man working in a room rising 10 percent and leading from a heading that receives air traveling only 80 ft. in a minute. Then the face, if it produces methane, will have to get all the air that is sent into that heading because the methane will have to travel down that 10 percent. It clearly suggests that in no heading should the air travel at less than 200 ft. per minute, no matter how few men are in that entry or how long it is. Speed is necessary or all impurities will not be moved.

CURRENTS OF AIR THAT WILL MAKE METHANE TRAVEL DOWNWARD ON SPECIFIED GRADIENTS

Inclination of Passageway as a Proportion	Gradient as a Percentage	Angle of Pitch	Air Speed Against Which Methane Can Travel, Ft. per Min.
1 in 100.....	1	0° 34′	8
1 in 50.....	2	1° 09′	16
1 in 33.33...	3	1° 43′	24
1 in 25.....	4	2° 17′	32
1 in 20.....	5	2° 52′	40
1 in 16.67...	6	3° 26′	48
1 in 14.29...	7	4° 00′	56
1 in 12.50...	8	4° 34′	64
1 in 11.11...	9	5° 09′	72
1 in 10.....	10	5° 43′	80
1 in 5.67...	17.63	10°	141
1 in 2.75...	36.40	20°	291
1 in 1.73...	57.74	30°	462
1 in 1.19...	83.91	40°	671

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Imperfect Combustion Forms Monoxide

In earlier years, the practice in mines was to burn out the methane with torches once, twice or even three times daily. One wonders at the superhuman resistance of the miners to carbon monoxide. Surely, none or little of that gas could have been formed by the explosions, though the quantity of oxygen in the workings always must have been insufficient. In the anthracite region, except in relation to fires, less is said about the effects of carbon monoxide than in the bituminous region, where rock dust often is used in quantity. Flames of burning carbonaceous material contain carbon monoxide interiorly, but exteriorly that gas burns to carbon dioxide.

This is no argument against rock-dusting, only that it should be adequate and ubiquitous enough to prevent or localize any extensive explosion, and that every study should be made that we may learn how to prevent carbon monoxide from spreading through the parts of the mine not directly traveled by the explosive gases. Burning and carbon-monoxide poisoning today seem the fate of those caught in an explosion of gas or dust in a bituminous mine, whereas dismemberment was more frequent and more complete before rock dust entered the field.

It may be that the greater quantity of fine coal dust partly explains the formation of carbon dioxide in the modern mine. In early years, coal was not mined by machines or blown down by explosives, and all the coal accordingly was so coarse that explosions of dust were rare and the explosions that occurred were of gas. There also was little dust to form hot coke that, after the explosion, could turn dioxide to monoxide by a reductive reaction.

Free Enterprise

WHAT IS IT? HOW DOES IT WORK?

☆

Ours is a free-enterprise economy the chief motivating forces of which are the prospective rewards for effort and risk-taking. Its smooth operation depends: first, on adequate incentives for risk-taking, innovation, and individual effort; and second, on sufficient competition to minimize the need for government regulation and to prevent artificially high prices or wages from being maintained in large segments of the economy. Trouble comes when these incentives and this competition are tampered with or removed.

America was founded by men who had the urge to better themselves and the courage to take a chance. These men uprooted themselves in Europe and braved the unknown. They risked all for freedom. They knew that, to be free, they had to attain economic freedom. Their goal was an economic freedom which permits the private ownership of property, the free choice of jobs, and free entry into entrepreneurial pursuits. Their efforts, therefore, were directed toward individual opportunity with no limit on individual achievement. Their foresight and the endeavors of those who followed them created the world's greatest industrial nation enjoying the highest standards of living.

We can take pride in the knowledge that our country has been the greatest single contributor to the world's physical assets even though we remember that an abundance of natural resources contributed materially to America's economic development. But the fact that our progress has been interrupted, again and again, by depressions which resulted in enormous wastes of our human and material resources is sobering proof that our economic mechanism still is far from perfect.

Our production per man-hour has been increasing at the rate of 2½% per year. Improved machines and greater efficiency have more than tripled the output per hour of work since 1900. Looking to the future, this annual rise indicates that our production per hour of work will double in the course of the next 25 to 30 years. This means that we can have twice our present volume of goods and services per capita or an equivalent combination of more production and more leisure. In other words, we can further increase the living standards and further decrease the working hours of the American people by further intensifying our industrial efficiency.

This is no idle dream. It can be achieved, and it will be achieved, if only we maintain the essential features of our system of individual enterprise which alone makes possible this near-utopian goal. Intensification of our efficiency, however, means that we can have full employment only if we expand enormously our production, and particularly our production of new goods. We can expand total production only if we have the markets and the demands for the vast output of goods and services made possible by our technological development. To attain these, we will need to venture into new markets, new inventions, and new methods. Such ventures involve risks, and risks will be taken only if there is sufficient prospect of reward.

Let us never lose sight of the fact that the essential features of free enterprise are the prospective rewards for risk-taking as well as for effort.

The evidence is clear that incentive methods of wage payments will boost production. Carefully devised systems of salary payment with large differential inducements for superior performance have been powerful means of raising the standards of managerial accomplishment.

Free enterprise cannot operate effectively unless the wage and salary system offers greater rewards for greater effort. Neither can it operate effectively unless the prospects for profit are sufficient to encourage the employment of resources which otherwise would be kept idle.

Unless the prospects of profit are superior to the prospects of loss, new ventures will not be undertaken and going concerns will not expand or continue long in business. When the hope for profits wanes, employment and production slump; when that hope revives, employment and production recover.

Business initiative must be given every possible in-

ducement in order that maximum employment may be achieved through private enterprise. This involves the removal and avoidance of restrictions on business by government, by labor, and by business itself.

Competition is the life-blood of the free enterprise system. Business and industry must rely upon efficiency rather than upon protection from competition for their survival.

Those government controls which were made necessary during the war by the magnitude of government demands for goods should be lifted at the earliest possible moment. As soon as the danger of inflation has receded, price controls must be removed and profit margins again left free to be determined by market forces. The excess profits tax must be repealed and the burden of other taxes on business profits greatly reduced. Tax laws should be revised so as to permit adequate rewards for assuming risks. The modernizing of anti-trust laws and their vigorous enforcement, not indiscriminate persecution, will be supported by all who really want free enterprise. Such measures will strengthen the incentives to expand old businesses and to start new ventures.

Grants of unlimited monopoly powers to labor unions which enable them, consciously or not, to sabotage the profit incentive in business must be withdrawn. Labor has certain legitimate rights; and in order to preserve them and its freedom, labor must come to realize that its best interests lie in a well functioning, self-disciplined competitive free-enterprise economy.

There must be evolved in the minds of business, labor, and the public a recognition of the need for private business enterprise and a realization that policies which throttle it are harmful not only to businessmen but to workers and consumers as well. Unless we achieve this understanding and avoid needless deterrents to business expansion, we are likely to pay for our folly in the destruction of our free enterprise system.

We cannot tolerate conditions in which special interest groups in business, labor, agriculture, or politics prevent free access to the market by would-be competitors. Such monopolizing of opportunities stifles progress and creates profits or wage rates based on artificial scarcity. In such cases government interference to open the market to all comers is clearly indicated. We must recognize the need for constructive policies by business, labor, and government which will insure the competition necessary for the successful operation of our economy.

Increased government regulation and control of business activities is not conducive to strengthening the virility of private enterprise. Government ownership and operation of productive resources certainly is not to be condoned. The more government rules and regulates business, the less will be the incentive to assume risks and to exercise individual initiative. Government regulation of the detailed operation of industry inhibits progress, is prey to political pressures, and is subject to the human failings of its administrators. *Better far the rough guidance and justice of vigorous, though somewhat imperfect, competition than the uncertainty of arbitrary regulation.*

The gravest threats to our competitive system exist in legalized monopolies, such as the N.R.A. once comprised, such as the labor unions and farm groups have recently achieved, such as businessmen themselves have sometimes sought. The power of labor monopolies to encroach on business profits will tend to interfere seriously with the needed flow of new investment. And when any group is strong enough to move the average level of costs as much as the labor groups and the farm groups are able to do, there is good reason to fear that, when we begin to approach high levels of employment and production in time of peace, these groups will induce a price-wage spiral which will waste money incomes on price increases instead of permitting them to draw unemployed resources into production. While the demands of labor for collective bargaining rights and the demands of farmers for protection against the rigors of depression have validity, there can be no reason for excessive grants of power and privilege which threaten to make our system of free enterprise unworkable.

Ours is a complex economic structure. The functions which prices, income, savings, investments, and taxes play in this system are difficult to comprehend.

As I have said before: Thinking is hard work, and we will have to work hard if we are to develop business policies, labor policies, and government policies which will insure full employment and the opportunity for consistent profit. Yet only through such policies can we guarantee that private enterprise will be the predominant source of jobs, income, and production.

Even more difficult than thinking, and more important, is the implementation of many policies that are in the interest of the free enterprise system. Not all measures will satisfy all people. Special interests will have to be subordinated to the total interests of the nation. Sacrifice and vision have been essential to the winning of the war. They will be no less essential to the winning of the peace.

If we can gain recognition of the crucial role of incentives for enterprise, if we stand squarely for competition and against protection or privilege for special interests, and if we bend our efforts to find satisfactory ways and means to prevent large-scale unemployment, we can have the full benefits which only a free enterprise system can produce—in industrial progress, in improved standards of living, and in the preservation of our democratic ways of life.

President, McGraw-Hill Publishing Company, Inc.

STATE-BOARD QUESTIONS

Mine Foremen, State of Alabama*

Q—Why is an excessive volume of air to be avoided and what are some of the disadvantages of a high-velocity current?

A—1. Because it raises coal dust and so provides conditions favorable to an explosion by blowing dust in the air where it can be ignited and by preventing the settlement of dust that has been created by mine operations.

2. Because it carries too much dust into the return airway, which, if not a travelway, will be rock-dusted with difficulty, and if a travelway, will be subject to ignition by electrical and other means and which in either event in a gassy mine will have a higher percentage of methane to aid an explosion than can be found in the intake airway.

3. Because it dries the mine in the winter by bringing in a quantity of air that becomes warm and thus greedy to take up moisture which it can get only from the mine.

4. Because it causes the roof to become wet with moisture in the summer (by the cooling of the warm outside air to the temperature of the mine) and so dampens and cakes the rock dust, preventing it from rising when an explosion occurs, and because it so dampens the roof on its lower surface that the roof swells and falls, creating a hazard and an expense and also causing the fall of trolley hangers and wires, also of other electric feeder circuits, thus favoring the occurrence of explosions.

5. Because it may make the safety lamp less secure, for it has been found that the gauze in even the best of safety lamps and even when these are in proper condition, will, in methane, pass flame.

6. Because during the winter months, it chills excessively the men leaving the mine in the face of the intake, rendering them victims to tuberculosis, pneumonia, colds and silicosis.

7. Because it freezes up the mine shafts or drifts in winter and may interfere with drainage and in a small mine may chill the men at the working faces.

8. (And this is controversial) Because it provides air of such high oxygen content as to favor mine explosions and mine fires.

9. Because it causes corrosion and other forms of oxidation that weaken mine roofs and pillars.

10. Because it is costly and wasteful of power and necessitates purchase of equipment to meet the excessive delivery of air.

*Continued from August, 1943, *Coal Age*, p. 94.

Least Air Speed

Q—What should be minimum velocity at the working face and why?

A.—In Alabama enough air should be delivered in any split to bring the quantity of methane in the return current down to 0.25 percent of the required maximum percentage in the main return, though the inspector will not condemn a place if the return of the split contains no more than 0.5 percent. The main return will have more than 0.25 percent if most of the splits are returning with over 0.25 percent, and a split with too much air will furnish a good opportunity to make up for some other split that has developed a disposition to produce at times a higher percentage.

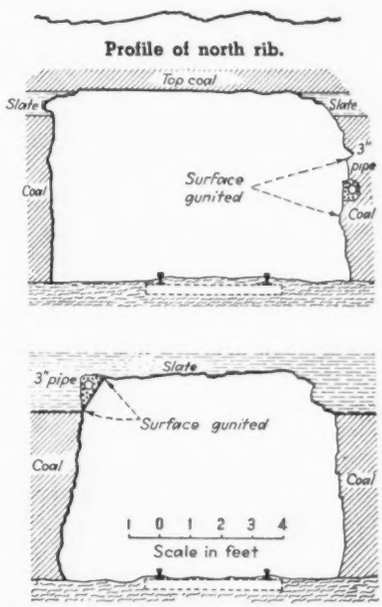
The air also should be made to travel fast enough to sweep the mine passages clear of carbon dioxide, powder fumes and oil smoke, whether from open lights or safety lamps, so there should be a minimum velocity in any mine, gassy or non-gassy. Enough air may be traveling to satisfy the law's minimum requirements for air volume under Sec. 1655 (100 f.p.m. per man and 500 f.p.m. per mule or horse), yet not enough to compel the air to travel all over the workings. It must be remembered that the inspectors in Alabama are not limited to the minimum requirements stated; they can, and are expected to, demand more where needed.

When the speed of the air is slow, it has a disposition to choose easy channels: just a small stream of water keeps within banks, whereas a flood of water sweeps everything before it. Even if checked and compelled to enter rooms, it will merely go to the first crosscut and pass through to the next room, for unless the room brattices are much tighter than usual, if there are any at all, it will be able to pass through them and leave the place unventilated beyond and, similarly at the end of the room or heading if there is nothing to compel the air to pass to the face, it will not go beyond the last crosscut, however excellent the bratticing in the other crosscuts. The air should travel fast enough to have inertia that will carry it on beyond its directed course. Minimum velocity should be at least 200 ft. per minute. That speed will help it to compel light gases to travel with it downhill and heavy gas to travel with it uphill, thus preventing segregation.

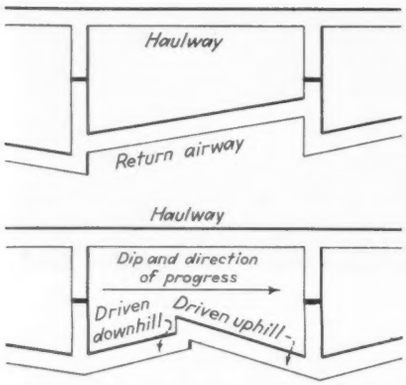
Q—Why should irregularly driven airways be avoided?

A.—Irregularly driven airways increase resistance. When headings are not driven on sights and miners gouge into the sides in making undercuts and in shooting, resistance, or friction, is increased and may even be doubled. H. P. Greenwald and G. E. McElroy, for the U. S. Bureau of Mines (Bull. 285), showed that when canvas brattices are provided to cover over the mouths of crosscuts and thus create straight unbroken ribs, the resistance per square foot with a velocity of 900 ft. per minute was 0.000,000,003,26, as against 0.000,000,021,6 which Atkinson regarded as an average coefficient. Thus Atkinson's figure was 6.6 times as big as that obtained by the Bureau of Mines with conditions that still were none too good, as can be seen from the cross-section of the airway in the illustration. Atkinson averaged a whole mine and doubtless had some falls and bad roof.

Where miners drive off line and find their pillar too small or too large and at the next crosscut make up for the deficiency or excess, as the case may be, the air actually strikes the offset and has to make an S turn, causing considerable resistance. Sometimes in driving a dipping a decision is made, after some of the back heading has been driven ahead of the last crosscut, that it is too much trouble to pump two places, so only the intake heading is advanced as far as the next crosscut and then the crosscut is driven to



Cross-section of heading in which tests were made.



Examples of bad back heading driving.

the right distance and the back heading driven up to meet the part of the back heading already driven. Most of the time, the sections of the back heading do not meet satisfactorily and a big offset results, greatly increasing resistance.

Q.—(a) What causes unequal resistance to ventilation in different splits? Explain fully. (b) What is commonly done in splits to equalize ventilation resistance?

A.—(a) Splits offer different resistances to ventilation:

(1) Because they are of different lengths, the usual reason.

(2) Because they have different resistances per square foot of rubbing surface, or, as it is technically stated, because they have "different specific resistance"; that is, different resistance for some specified area, usually, in this case, a square foot. Cross timbers, posts, piled timber, trolley hangers and wires, feeder cables and their hangers, irregular roof contours, line brattices, fallen roof, especially roof rock that leans against the rib or on other rock or on timber, falling water, water pools in low swags, sharp turns, offsets in airway, regulators and checks all increase resistance. Any return airway will gradually increase in resistance as years pass.

(3) Because they have differences in cross-section and in the relation of cross-section to rubbing surface.

(4) Because different speeds are needed in different splits as more methane has to be removed in some than in others, more men, horses and mules have to be supplied with air and sometimes more carbon dioxide has to be swept out.

(b) Regulators are used to make the resistance such that every split will get the proportion of the total air it needs to remove methane, carbon dioxide and explosive fumes and to satisfy the men and animals therein. Resistance should not always be equal between splits. You may need to have more air in one entry than in another.

Pa. Bituminous Foremen, 2d Grade†

Q.—What kind of stoppings may be built in crosscuts in room entries?

A.—"Stoppings in cross entries in non-gaseous mines may be built of timber." Law says nothing as to gassy mines. (3 points)

Q.—How would you deflect air into rooms in which there are open crosscuts?

A.—By checks on the heading and stoppings built in all except the last crosscut. (3 points)

Q.—What kind of material may be used for building stoppings in room crosscuts?

A.—The mining law permits the use of brattice cloth or boards—Art. IX, Sec. 5. (2 points)

Q.—What is the legal distance between crosscuts on headings?

A.—Not less than 48 or more than 105 ft.—Art. IX, Sec. 3. (2 points)

Q.—What is the legal distance between crosscuts in rooms?

A.—No less than 48 or more than 105 ft.—Art. IX, Sec. 3. (2 points)

Q.—What is meant by "cushion blasting"?

A.—Leaving an air space between explosive and tamping or between explosive and the walls of the hole in which it is placed or both. (1 point)

Q.—Who designates the maximum number of men allowed on the cage at one time?

A.—The mine foreman—Art. XXV, Special Rules, Rule 7. (1 point)

Q.—Who designates the speed of the fan?

A.—The mine foreman—Art. XXV, Special Rules, Rule 7. (1 point)

Q.—What is the maximum speed of the cage, permitted by law, while hoisting men?

A.—900 ft. per minute—Art. VIII, Sec. 5. (1 point)

Q.—How often must safety catches be tested on cages at shafts where men are hoisted?

A.—Every two months—Art. 8, Sec. 1. (2 points)

Q.—How often must ropes and cages be inspected?

A.—Every 24 hours—Art. 8, Sec. 3. (2 points)

Q.—What are the minimum dimensions of a passageway around the bottom of a hoisting shaft?

A.—No less than 5 ft. high and 3 ft. wide—Art. VI, Sec. 3. (2 points)

Q.—Give the code signals used for hoisting men on cages.

A.—The cager gives three signals or bells. The engineer signals back when ready, men get on the cage, and the cager signals one bell to hoist—Art. XXV, General Rules, Rule 31. (2 points)

Q.—What maps are required by law to be kept at the mine?

A.—Map of mine workings and a map of electrical equipment and wires—Art. II, Sec. 1; Art. XI, Rule 14. (3 points)

Q.—How often must the mine map be brought up to date to show all of the excavations of the mine?

A.—Every six months—Art. II, Sec. 4. (2 points)

Q.—On haulage roads where haulage is done by trolley locomotives, where must all wires be installed?

A.—All wires except telephone, shot-firing and signal wires shall be on the same side of haulage road as the trolley wire—Art. XI, Sec. 39. (4 points)

Q.—Where men have to pass or walk under trolley wires, at what minimum height may the wires without guards be installed?

A.—6½ ft.—Art. XI, Sec. 40. (2 points)

Q.—What is a tourniquet?

A.—A device to stop the flow of blood; originally a bandage tightly twisted with a stick so as to force a small hard pad against an artery and thus compress the artery; where readily available the stick is now replaced by a screw device that forces a pad against the artery. (1 point)

Q.—What first-aid material must be kept at the mines?

A.—Stretchers, waterproof and woolen blankets, splints, bandages, and other medical supplies—Art. XIII, Sec. 2. (5 points)

Q.—In firing shots electrically, if one of the shotfirer's shots has misfired, how long must he wait before returning to the face?

A.—Five minutes.

Q.—What kind of sockets are legal for use with fixed incandescent lamps in the mines?

A.—Weatherproof type—Art. XI, Sec. 7, Rule 62. (2 points)

Q.—What are the legal dimensions for traveling ways?

A.—Minimum width must be 6 ft. where the coal seam is less than 3½ ft. thick, the traveling way must be 4½ ft. high or more. Where the coal seam is 4 ft. thick, that height must be at least 5 ft.—Art. VI, Sec. 4. (4 points)

Q.—In what condition shall traveling ways be kept?

A.—Traveling way shall be well drained, free from smoke, noxious gases and refuse of all kinds and unencumbered by electric wires, unless such wires are so placed and protected as not to endanger life and are kept in safe condition—Art. VI, Sec. 4. (5 points)

Q.—Who specifies the manner in which tools may be hauled into the mine?

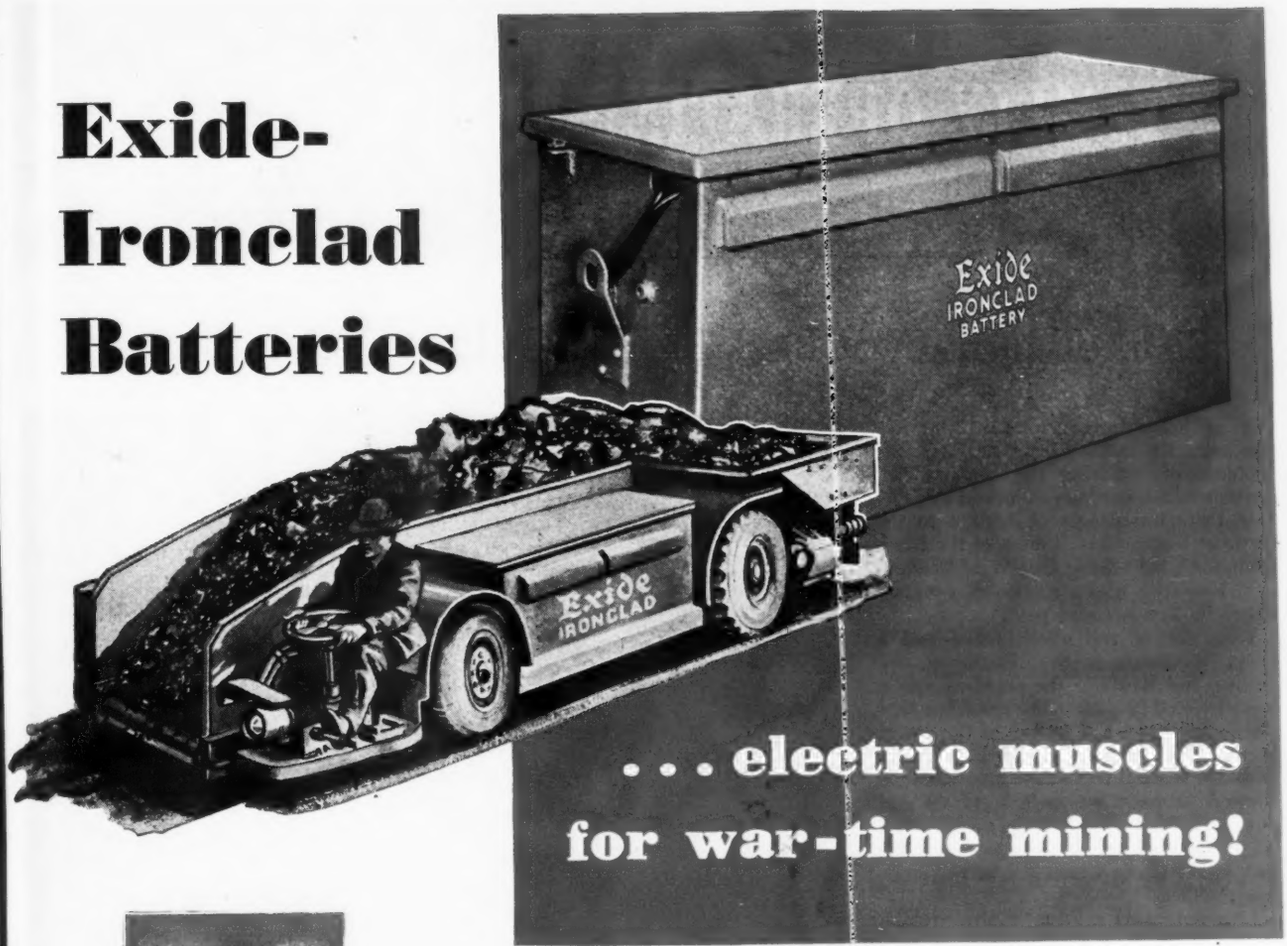
A.—The mine foreman—Art. IV, Sec. 22. (2 points)

Q.—Whose responsibility is it to provide rerailing devices for all locomotives used in the mines?

A.—The superintendent—Art. III, Sec. 6. (2 points)

† Continued from September, 1943, *Coal Age*, p. 82.

Exide-Ironclad Batteries



. . . electric muscles for war-time mining!

HERE'S the husky helper who aids in speeding needed coal to the production line. It's an Exide-Ironclad, used for powering shuttlecars, all over America . . . day in and day out.

There's a good reason for choosing an Exide-Ironclad for battery-operated shuttlecars, electric locomotives, and trammers. Its absolute dependability, long life and ease of maintenance save labor and costs as well. It delivers a terrific surge of power at high voltage for constant hauling speeds, and assures a minimum of interruption to service. All of which are vital to the speeding of supplies to the fighting fronts.

The sturdiness which has always been built into every Exide-Ironclad, serves a high purpose under war conditions. When you buy an Exide you *Buy to Last*. Take care of yours, and *Save to Win*.

DELIVERIES—Despite war-time conditions, we are quite sure that we can make deliveries to meet your requirements.

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SAVE TO WIN

THESE STEPS PROLONG A BATTERY'S LIFE:

1. Keep adding approved water at regular intervals. Most local water is safe. Ask us if yours is safe.
2. Keep the top of the battery and battery container clean and dry at all times. This will assure maximum protection of the inner parts.
3. Keep the battery fully charged—but avoid excessive over-charge. A storage battery will last longer when charged at its proper voltage.
4. Record water additions, voltage, and gravity readings. Don't trust your memory. Write down a complete record of your battery's life history. Compare readings.

If you wish more detailed information, or have a special battery maintenance problem, don't hesitate to write to Exide. We want you to get the long-life built into every Exide Battery. Ask for booklet Form 1982.

TIMELY OPERATING IDEAS

Shaker-Conveyor Ball Cradle Guides Tipple Screen

Use of ball-bearing cradles which were purchased for shaker conveyors solved the problem of steadying the main shaker screen which sometimes shimmied so badly that there was danger of damage to the frame at Blocton No. 9 mine of the Black Diamond Coal Mining Co., West Blocton, Ala. Now the screen motion is confined strictly to the intended path.

One side of the screen frame and a cradle is shown in the illustration. By cutting and welding, the standard cradle was narrowed to go into the space between the angles at top and bottom of the screen frame. As the left part of the cradle moves with the screen the other part must be allowed to move an inch or so up and down. This is provided for by metal guides on the wood post and flanges added to the part of the cradle which acts as the cross-head.

The cradle is placed between tipple post and side frame of screen. On the opposite side is another post and cradle.

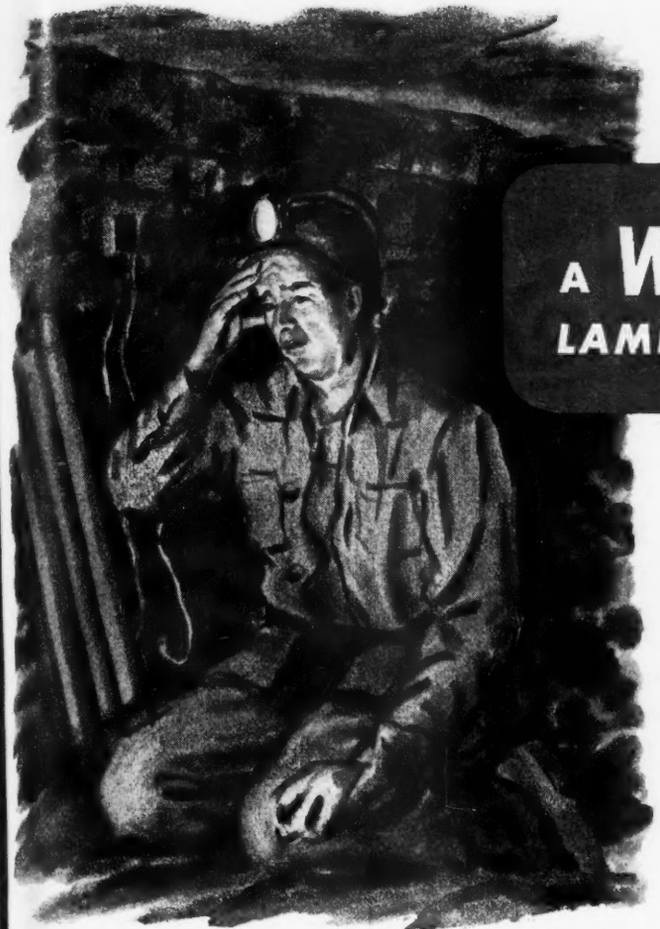
Wash-House Shower Sprays Allay Domestic-Coal Dust

Although oil is unavailable as a dust allayer for the duration, housewives still insist on relief from dust when coal is shoveled into the basement. Here is how that problem is met at the No. 2 mine of the West Kentucky Coal Co., Sturgis, Ky. Four wash-house shower sprays are assembled with pipe in the form of a cross. This is attached to the water supply at a point convenient for trucks to be driven under and about 12 ft. above the roadway.

The trucker drives his loaded truck to the office scale, where the transaction is completed. Then he drives under the spray assembly and turns on the water. He usually sprays one-half the load, then moves up to complete the wetting process. When he considers the wetting satisfactory he turns off the water and proceeds with delivery.

The loading, weighing and spraying points are convenient to one another and in the line of travel.

Dustlessness during delivery is assured by this spraying arrangement in operation on a truckload of coal.



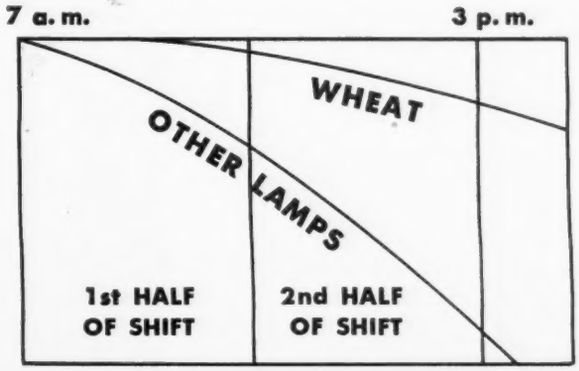
A WHEAT ELECTRIC CAP LAMP REDUCES EYE FATIGUE

IT's along towards the end of a shift and this miner is tired. Why? Because added to natural fatigue, the light in his cap-lamp has dimmed, causing a strain on his eyes which in turn tires his whole body —and REDUCES HIS PRODUCTION EFFICIENCY! This need not happen in your mine if you equip your miners with the NEW WHEAT CAP-LAMP. This cap-lamp maintains a better than 80% efficiency throughout a working shift. Give your miners an approved cap-lamp and reap the benefits of increased productivity and reduced compensation costs!!

Write for further particulars on the NEW WHEAT CAP-LAMP—TODAY!

THESE FEATURES MAKE *WHEAT* THE OUTSTANDING ELECTRIC CAP LAMP

1. Two bulbs (one for emergencies) — miner is never in the dark.
2. Headpiece weighs less than 6 ounces, Lamp Cord 6 ounces, Battery 62 ounces — Total weight of Lamp complete 74 ounces.
3. Headpiece molded of strong bakelite, sealed, moisture-proof and dust-proof.
4. Rubber battery case — non-conductor of electricity — a valuable safety feature.
5. Battery solution (free) limited to one ounce total both cells.
6. Lead-acid type battery maintains high voltage throughout shift (80 + percent efficiency) — year after year.
7. Battery charged through headpiece and cord of cap lamp — a daily test of all connections.
8. Designed for self-service charging system for lowest lamp-house operating cost.
9. To charge, headpiece is simply slipped on to key in charging rack, and turned to make contact. Nothing to take apart — unit-sealed construction.



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Marlboro, Mass.

Drill Press From Scrap Equipped With Casters

Some coal mines build machine tools when they can't buy them. The beautifully finished motor-driven portable drill press for drilling up to ½ in. shown in the accompanying illustration is another creation of Gus Sayrs, head machinist for the Delta Coal Mining Co., Marion, Ill.

A welded substructure of angles and flat plate, mounted on large casters, carries the drill and makes it portable. The top part of the base structure is a heavy arc-welded drip pan which catches waste oil and drillings, so that nothing falls on the floor.

The column, made of 3-in. extra heavy pipe, is bolted to the bottom of the drip pan by a flange screwed to the bottom of the column. A 3-in. tee, bored to fit the machined column and split on one side, forms a clamp support for the platen. A segment cut from one side of the platen is mounted on a frame that is operated by a screw, making a permanently attached vise.

A 3-in. tee attached to the top of the column provides mountings for the top end of the drill spindle and for the motor. Matching 3-step V-pulleys on motor and drill spindle provide a three-speed driving arrangement. The lower spindle support was machined from a chunk of scrap aluminum.

A ball bearing built into the end of the spindle sleeve carries the drill thrust. A standard taper in the lower end of the spindle provides for bolting taper drill shanks or a drill chuck for small straight shank drills.

Mounted on casters for portability, this drill press was built in the Delta shops.

Moving Forward

Exchange of ideas helps the world move forward. If everyone makes a contribution, methods are improved and everybody benefits. By a suggestion here and a suggestion there technical progress is made. If you have a system, practice or short cut that you think will help the man at the mines, these pages are the place to pass it on to others to help in solving their problems. If a sketch or photograph will make it clearer, send one along. For each acceptable idea COAL AGE will pay $5 or more on publication.

The feed is by triple hand levers mounted on the feed shaft. All parts of the drill that are not machine-finished are painted an attractive color. The motor is new. A portable rubber insulated electric cable is permanently attached to the motor. It has a heavy connecting plug on the free end, permitting attachment to any convenient power receptacle.

Glass Chutes Last Long and Ease Passage of Coal

Difficulty in getting steel or alloy plates to use in breaker chutes made the Locust Coal Co., Shanendoah, Pa., look around for some other material to serve its purpose at its Weston preparation plant and caused it to try out glass plates for that service. So successful have these been that they will be preferred for this duty even after the war and shortages have ceased to trouble the breaker foreman. These plates in the Weston breaker enabled coal to be shifted from one side of the breaker to another in a manner that would not have been possible had not the glass plates given the coal a far greater mobility than in times past.

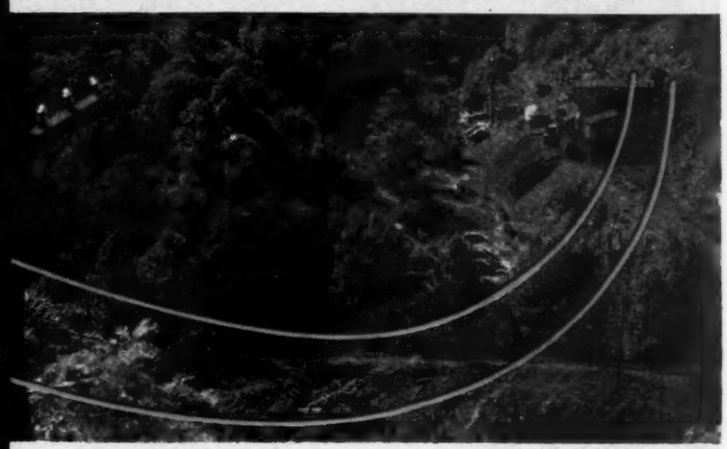
These Carrara glass plates, supplied by the Glass Division, Pittsburgh Plate Glass Co., have been used since Nov. 22, 1942, and have outlasted already three pieces of alloy steel. Alternate sections of glass and steel were installed in the first test to make possible an ideal comparison. Some of the chutes with the material, defined as "reasonably dry," are carrying nut coal on an inclination of only 2 in. to the foot. The wood chute is first lined with 3-ply roofing paper to take up any unevenness. The glass is given a ⅜-in. side play on each side. To hold down the glass, a ¾-in. hardwood strip is nailed along each side. The plates are ¾ in. thick and 36 in. long. The width, of course, is the same as the width of the chute less side play. The plates are simply butted together with only just enough tar filler between them to fill up any unevenness in the plates.

The glass chute—a war baby—proves enduring and suited to easy gradients. H. B. Weed (left), representing the manufacturer, displays a glass section. William H. John (right) exhibits a worn-out steel plate, while John Ruchinsky, assistant foreman, looks on.

Timken Bearing Equipped cars on way to dump, showing remote-control-operated locomotive.

13 years service—

ORIGINAL TIMKEN BEARINGS STILL GOING STRONG



Aerial tramway conveying coal across the valley from dump to tipple in Timken Bearing Equipped buckets.

Post-victory competition will be keen; prepare for it now; redesign your equipment to include more Timken Bearings.

That's the record to date of the Timken Bearing Equipped all-steel mine cars at the Anchor Coal Company, Highcoal, W. Va. Not a single bearing failure has been experienced since the cars were placed in operation in 1930; this is all the more remarkable because the cars have been continually overloaded. They were built to carry 3 tons of coal, but actually handle from 5 to 6 tons through the use of cribbing.

Transportation at Highcoal presented a difficult problem; it has been solved by a combination of mine cars and aerial tramway. When the cars are brought out of the mine they are placed on a siding and passed through the dump by one man who operates the small locomotive shown in the photograph by remote control. The coal then is carried to the tipple by the aerial tramway, the buckets of which also are equipped with Timken Tapered Roller Bearings. Thus, Timken Bearings are carrying practically all the transportation burden at Highcoal; the Anchor Coal Company knows it pays. The Timken Roller Bearing Company, Canton, Ohio.

TIMKEN

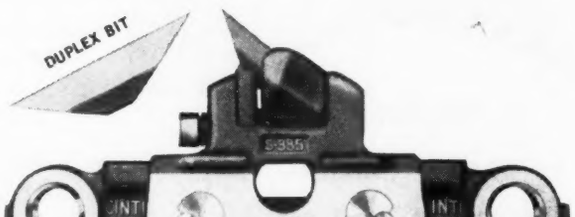
TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

Official U. S. Navy Photograph

CINCINNATI CHAINS, BITS AND BARS HELP MINE OPERATORS KEEP PRODUCTION UP!

WE in the coal industry, realize the important part that Coal plays in producing the essentials of war and peace. Your job is to keep coal moving to meet production demands . . . our job is to give you strong, tough, dependable Cutter Chains, Bits and Bars. Today as in the past, Cincinnati Cutting Equipment is doing an outstanding job for mine operators all over the country. Cincinnati Chains and double-ended reversible Bits not only help operators step up production but cut their cost per ton as well. If you have a coal cutting problem . . . let us hear from you.



CINCINNATI DUPLEX CHAIN

Hardened Eccentric Pin is designed so it can't turn in block . . . puts joint wear between pin and insert.

Easily removed heat treated Rivet holds Bearing Pin against longitudinal displacement.

Long life, replaceable, hardened alloy steel Connector Insert gives new factory joint accuracy to a worn connector.

THE CINCINNATI MINE MACHINERY CO.

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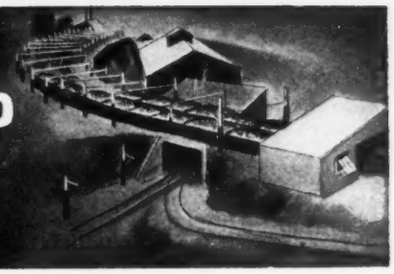
COAL AGE NEWS ROUND-UP



Strikes Threaten New Mine Seizure

WLB Certifies Growing Coal Strikes to President, Presaging Seizure; Board Rejects Illinois Pact, Gives Anthracite Miners 32c. per Day

WITH THE MINERS jumping the gun on the Oct. 31 deadline to the tune of 60,000, the War Labor Board referred the stoppages to the President on Oct. 28 in a move presaging a new seizure of the nation's coal properties. Oct. 28 also brought a decision in the anthracite case in which hard-coal miners were awarded a wage increase of 32c. a day plus remission of lamp, tool and other charges aggregating some 25c. daily. This decision followed rejection of the second Illinois agreement, accompanied by a Board statement that it could approve one carrying a rate of $8.12½ for an 8½-hour day instead of the $8.50 proposed.

While union officials took no immediate action on the WLB decisions, John L. Lewis called a meeting of the policy committee for Nov. 1 and in the meantime sent out on Oct. 28 an "explanatory" telegram forecasting rejection of the Illinois decision and a continuation of his fight for an increase of at least $2 a day. Acceptance of the Illinois agreement, he declared, "would impose a wage reduction on the mine workers of the nation amounting to 4½c. per hour."

32c. Daily to Anthracite

Measuring proposed raises against the Little Steel formula, WLB, in its anthracite decision, found that the formula permitted an increase of only 32c. per day. The miners originally had demanded $2 a day, plus portal-to-portal and other concessions, although the $2 figure had later been scaled down to $1.30. As in its Appalachian decision of June 18, the Board remitted lamp, tool and other charges aggregating some 25c. per day. Prescribing a two-year term for the agreement, the Board issued no ruling on travel time in the anthracite industry. Stating that the parties had discussed a lump-sum settlement to be distributed evenly throughout the wage structure by addition to wage rates for production time, but had not contemplated a change from a "face-to-face" to "portal-to-portal" basis, the Board pointed out that they could not agree upon any settlement "of the claim for further compensation which arises out of the fact that the method of compensation is based upon productive hours worked at the face—the so-called face-to-face system. We cannot force upon them the settlement of a lawsuit which we have no power to decide."

In rejecting the new Illinois agreement signed Sept. 23 WLB proposed an alternative providing slightly less than the agreed-upon wage payments which it announced it could accept. Terming the new agreement as one presenting "for the first time a true portal-to-portal method of compensation of mine workers," the Board took exception to the agreement's provision for a payment of $8.50 for 8½ hours of work. In taking this exception, the Board accepted a figure of 45 minutes for travel time, which would increase working time 45 minutes per day. On this basis, it stated that payment for working time should not exceed $8.12½ (seven hours of straight time at $1 per hour plus 45 minutes at time-and-one-half) and therefore the difference between $8.12½ and $8.50 would represent a wage increase not permissible under the stabilization program. "The Board could approve a daily wage of $8.12½ but not more."

Declaring that it approved the basic principle "of establishing a method of payment on an 8½-hour day, including travel time, in place of the old 7-hour day, excluding travel time," the Board ruled that the overtime provisions of the Illinois agreement with regard to inside men (overtime after 40 hours per week) were approved as being a matter of law under the Fair Labor Standards Act. As to outside employees and others whose normal work day had been eight hours, the board found the contract provisions to be a reasonable adjustment to maintain relative relationships and approved them.

"All the other provisions of the proposed Illinois agreement relating to wages merely embody wage adjustments which the Board already has approved, except the provisions of paragraph 13 that the sum of $40 will be paid to each mine worker on the payroll from April 1, 1943, to June 20, 1943, as a retroactive adjustment and in full settlement and discharge of all accrued portal-to-portal compensation. We think this amount represents a reasonable settlement and we can approve it. The other provisions of the proposed agreement, which do not involve wage adjustments, do not require our approval.

"Furthermore, if and when the operators and the mine workers in cooperation succeed in reducing the travel time for all mines covered by the agreement below 45 minutes a day, and simultaneously increasing the productive working time at the face, a contract could be approved allowing the miners a further increase in their daily wage. If the average time can thus be reduced to 30 minutes a day, the mine workers could be paid the full amount of the proposed Illinois agreement. If the Illinois contract is modified as above indicated, it will be approved by the War Labor Board."

Hearings on the Illinois agreement got under way Oct. 21.

R. L. Ireland Jr., president, Hanna Coal Co., representing the northern Appalachian group, and Edward R. Burke, spokesman for the Southern Appalachian Joint Wage Conference, both protested that the agreement, as a pattern for the entire industry, would upset competitive relations in their fields, in addition to violating the "Little Steel" formula.

Small Output Gain Seen

The Illinois plan, which calls for an 8½-hour day, said Mr. Ireland, would increase productivity in the northern fields only 8 minutes a shift, and would raise over-all production costs 50c. a ton. As an alternative, he proposed that working time at the face be increased to 7½ hours, which would give the miners 88c. more per day, based on time-and-one-half for the extra half hour. In addition, it would result in a rise in coal production.

"The matter before you is a wage increase," Mr. Ireland told the board. "It will not result, of itself, in any appreciable over-all production of coal and it exceeds the requirements of the Fair Labor Standards Act should it be ultimately determined that under the act travel time is time worked. The coal operators of America, contrary to the opinion of some people, are not opposing fair pay to the miners. We are vitally concerned with winning the war. We are also vitally concerned with the dignity of government and with equal regard by all groups for

the law through which the government operates."

Senator Burke outlined three reasons for his opposition to the Illinois agreement: (1) The agreement involves a violative wage increase; (2) it would impose an unjustifiable expense in the cost of producing coal and in cost to consumers; (3) it would greatly disturb competitive relationships between miners and districts and of wage rates and conditions of payment.

The question of portal-to-portal pay, Senator Burke argued, should be settled by court action, already begun in the U. S. District Court for the western district of Virginia. Concluding, he made the following suggestion for disposition of the controversy:

"Your directive of June 18 established a contract for the Appalachian area complete in every respect save only a possible legal liability under the Fair Labor Standards Act. That question, as I have just said, is in process of adjudication in the only place it can be authoritatively settled. It is my considered judgment that this board should now reject the Illinois agreement and declare the controversy over a wage agreement at an end. You have directed that the 1941 agreement, with certain allowances made by you, shall continue in force until April 1, 1945. That is the agreement which the United Mine Workers publicly declared to be 'the greatest joint contract ever enjoyed by the miners in the world.'

Operators Act Promptly

"Your directive was promptly accepted by the operators. It is in full force and effect. This would seem the proper time for the United Mine Workers to indicate their acceptance of your order, rather than urge you to approve a new 'basic agreement for the industry' of a fundamentally different nature."

Agreement with the objections set forth by the previous spokesmen was indicated by Harold McDermott and D. A. Thomas, of Alabama.

The case for the United Mine Workers was argued by Col. Crampton Harris and Maj. Percy Tetlow. Both denied that the proposed agreement carried a wage increase in disguise. Colonel Harris contended that the operators could increase productive time by reducing travel time, and Major Tetlow prophesied that with the contingent liability piling up for portal-to-portal pay it might bankrupt half the coal companies of the nation if the court ruled that it had to be paid. Both men declared that the Illinois agreement represented an over-all increase of not more than 20 to 35c. per ton in production costs.

The Illinois agreement was defended by George F. Campbell, president, Illinois Coal Operators' Association; Thurlow G. Essington, counsel, and D. W. Buchanan, president, Old Ben Coal Corp. Mr. Essington said that while the agreement was essentially for Illinois, he did not doubt that if it were approved it would be adopted by other districts.

Explaining step by step the procedure employed in drawing up the agreement, Mr. Essington stated that "there is nothing hidden in so far as I know—not a thing. Every fact that we know has been presented to you, including a history of the situation, but I tell you, if you will approve this contract . . . the operators and mine workers in Illinois and a lot of operators and mine workers in other parts of the country will make those old tipples sing a song which they have not sung for a long time, and that song will be heard in Berlin and Tokio and this matter cleared up for this war period, I hope."

Foresees Higher Output

Of the 8½-hour day, Mr. Essington said: "If we can get along without any travel time we are going to get 8½ hours labor from a miner . . . There is an incentive to the operators to reduce that travel time and we tell you with all the sincerity at our command that we are going to get more production as a result of that productive time."

Board members in the course of the hearing kept probing for definite information as to the exact time spent in traveling, and showed a disposition to question any item which could not be directly related to travel, taking the stand that unless a payment was clearly related to that subject it could not be accepted.

With the hearing ending on Oct. 22, the War Labor Board convened on Oct. 23 to canvass ways and means of bringing to an end the wildcat strikes in Alabama. The Alabama walkout began early in October and by the middle of the month had tied up more than half the mines, later spreading to take in practically every property in the State. Dissatisfaction with return of the mines before agreement on a contract was reputed to be the major cause of the walkout. Spread of the movement to other states rapidly complicated the situation as the month wore on.

Following appeals from Secretary Ickes and the Under-Secretaries of War and Navy, the WLB took a hand in the Alabama imbroglio Oct. 15, calling upon Lewis and William Mitch, Alabama district president, "to urge the employees to return to their jobs at once so that full and continuous production may be resumed." The strike was termed by the board as "contrary to labor's no-strike pledge and the national policy." The board followed up its appeal with a directive Oct. 16 stating that "the said labor dispute has become so serious that it may lead to substantial interference with the war effort" and ordering the strikers to return to work "forthwith."

Urging the miners to end their walkout, Lewis, in telegrams sent out Oct. 16, said: "Yesterday, Secretary Kennedy and I conferred with seven members of the National War Labor Board. We answered all of their questions and they assured us they definitely would pass on the question of our contract next week. It is also my considered personal judgment that for reasons of logic the board cannot escape approving the pending contract and making it applicable throughout the industry.

"I know how discouraged and embittered you are because of the shabby treatment you are receiving. You are denied a wage that will provide adequate food for your families while the coal operators are making the greatest profits in history. However, we all want to avoid any damage to the war effort in the interests of our country. I am therefore requesting that each local union call a meeting and vote to immediately return to work. I hope each miner will again sacrifice his personal interests and subordinate his righteously outraged feelings and return to work on Monday."

When this and local appeals failed to get the men back to work, WLB ordered representatives of the union to show cause at a hearing Oct. 23 why the board's directive had not been obeyed. With Lewis absent because of illness, Secretary Kennedy and other union representatives attempted to minimize the gravity of the situation. I. W. Rouzer, president, Alabama Mining Institute, on the other hand, declared the situation to be serious and asked that WLB take jurisdiction.

WLB, said Chairman Davis, took the position that the miners are now working under their old contract with a retroactive clause, and that the board was concerned with getting all possible production from Alabama without delay. After hearing the testimony, Mr. Davis said that it appeared that the union was unable to control its men and that the board would have to take action by referring the matter to the President if the miners were not at work by Oct. 25. He then suggested a temporary contract with a provision for adding later the benefits growing out of a basic contract. Mr. Kennedy doubted the wisdom of such a contract, and accepted the suggestion that a further appeal be made to the Alabama men.

Urge Alabama Men to Return

Considerably less inflammatory in tone than Lewis' telegram of Oct. 23, the wire subsequently transmitted to Alabama by union officials again urged a return to work. "We believe," the wire declared, "this action will be in the best interests of the United Mine Workers of America. We urge our local representatives and all other officers and members of the organization to redouble their efforts to the end that a resumption of operations be had by Monday because we believe that the attention of the nation has been focussed on the justice of the miners' wage claims. It is our firm belief that any further idleness can only jeopardize our case."

With Oct. 25 showing no improvement in the situation, WLB on Oct. 26 wired union officials as follows:

"The National War Labor Board has by an earlier order directed all the mine workers who are on strike to return at once and the Board has accepted in good faith the assurance of the officers of the United Mine Workers that they would do all within their power to terminate such strikes. Nevertheless, continuation of the coal strikes has been reported to the Board.

The nation cannot tolerate such impairment of vital coal production. Therefore, the National War Labor Board has unanimously decided that if the coal strikes do not cease by Thursday morning, the Board will immediately refer the matter to the President for appropriate action."

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British to Conscript Men for Mines

Great Britain is turning to the draft to solve its critical coal-production problem, debate in Parliament revealed Oct. 12. In a cable to the New York *Times*, David Anderson described the new development as follows:

"The British Parliament tackled the coal question again today when the first part of a two-day debate on the industry took place in the House of Commons. Major Gwilym Lloyd George defended his work as Minister of Fuel and Power, announcing a policy to conscript men for mines on the same basis as for the armed forces. Nevertheless, the members of the Commons were far from satisfied, one terming the report 'a tragic disappointment.'

"Early in his statement Mr. Lloyd George noted that Britain was responsible for much more than the provision of coal to meet the needs of civilians and war factories. There are commitments to the armed forces, especially those abroad. The demands are beyond the power of Britain to satisfy, and accordingly an arrangement has been worked out with Canada and the United States through a combined production and resources board to mobilize the coal supply of all three of them.

"Mr. Lloyd George did not touch on the prospects for coal for domestic users here during the coming winter. The only indication of how matters stand was his reference to a continued saving in fuel at a rate at least equal to last year, which was a mild season.

"Older men in the armed forces with experience in mining will be released for services in the mines, Mr. Lloyd George said.

"The main source of manpower for the pits, however, will be the routine conscription measure. From now on the men will not have a choice; they will be directed to the place where the nation needs them most.

"The Fuel Minister admitted being surprised to discover 'that in nearly all cases where disputes had occurred' in the past year little or no use was made of the existing machinery for settlement. He predicted effect of this was bound to be serious for the trades unions and operators alike. Turning to the future, he said the management interests were worried over the lack of discipline because they had lost the right of dismissal during wartime. They may as well be resigned, he explained, since after the war there will be no return to the old days when the surplus of miners enabled the owners to wield a big stick. New techniques must be developed within the industry itself, he believes.

"It was disclosed that coal mining before the war stood far down in the list of British industries on wage rates for miners, placing them in the eighty-third position. Now they have risen to twenty-third.

" 'It is of utmost importance for the house to realize that any new proposals affecting the present structure of the coal industry will be considered in relation to long-term implications,' Mr. Lloyd George said.

"The spirit of the debate was well illustrated by a play on Mr. Lloyd George's title when Ness Edwards, Laborite from Wales, called him the 'Minister of Fuel Without Power.' The Opposition benches gave vent to their distrust of the system of dual control whereby the coal industry was now semi-nationalized. Mr. Lloyd George defended it along the line that things might have been worse."

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Preparation Facilities

BRANCH COAL CO., Llewellyn, Pa.—Contract closed with Deister Concentrator Co. for four SuperDuty Diagonal-Deck No. 7 coal-washing tables to treat No. 4 buckwheat.

CONCENTRATED COAL CO., Nesquehoning, Pa.—Contract closed with Deister Concentrator Co. for five SuperDuty Diagonal-Deck coal-washing tables to treat pea, buckwheat, rice, barley and Nos. 4 and 5 at rate of 25 t.p.h. of washed coal.

HARLAN-WALLINS COAL CORP., Mine No. 2, Verda, Ky.—Contract closed with Jeffrey Mfg. Co. for tipple equipment to handle 300 t.p.h. of mine-run.

PREMIER POCAHONTAS COLLIERIES CO., Premier, W. Va.—Contract placed with Kanawha Mfg. Co. for trip feeder, Kanawha power rotary dump, 250-ft.-long rope-and-button conveyor, shaker screens, crusher, vibrator screen, coal and refuse conveyors, and two Kanawha-Belknap washers for stove and nut sizes; capacity, 200 t.p.h.

RUBIN COAL CO., Forest City, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty No. 7 coal-washing table to handle barley coal.

STEAM COALS, INC., Shamokin, Pa.—Contract closed with Deister Concentrator Co. for one SuperDuty Diagonal-Deck No. 7 coal-washing table to treat No. 1 buckwheat coal.

WADDELL COAL MINING CO., Winton, Pa.—Contract closed with Deister Concentrator Co. for three SuperDuty Diagonal-Deck No. 7 coal-washing tables to handle rice, barley and No. 4 buckwheat coal.

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Advocates 40c. Hour Minimum

An 18-man committee appointed by the Wage-Hour Administrator for the metal ore, coal, petroleum and natural-gas extraction industries, which met in New York on Sept 28 (October *Coal Age*, p. 129) to consider the statutory minimum wage rate for the industries concerned, voted unanimously to recommend institution of a 40c. per hour minimum wage at that time. This recommendation will be the subject of a public hearing by the Administrator, probably in about a month, and it is expected that a formal order promulgating the 40c. minimum wage will thereafter be issued.

It was brought out that minimum wages in the mining and oil industries are in practically in all cases 40c. an hour or substantially higher and that the 40c. statutory minimum wage will automatically go into effect in any case by October, 1945.

Employer members of the committee were Max H. Barber, Cleveland-Cliffs Iron Co., Cleveland, Ohio; W. C. Broadgate, Arizona Small Mine Operators' Association, Prescott, Ariz.; M. L. Garvey, Pocahontas Fuel Co., McComas, W. Va.; W. W. Inglis, Glen Alden Coal Co., Scranton, Pa.; M. B. Couzens, United Gas Pipeline Co., Shreveport, La.; and Charles P. McGaha, president, Stripper Well Association, Wichita Falls, Texas.

"I keep seeing black chunks in front of my eyes."

Coal Distribution Controls Tightened

Washington Continues Claims of Deficient Production—Tight Domestic Situation, Especially in Anthracite, Results in Additional Controls

WITH SFA Administrator Ickes and coal operators in some disagreement as to present coal supply and prospects for production, increased pressure was put behind conservation measures in October. Further steps to insure equitable distribution and adequate supplies of anthracite and bituminous coal to users and communities likely to suffer hardship were taken, while easing of the fuel-oil situation resulted in an announcement that pressure for industrial conversion was being relaxed. And October brought with it the first reports of shipments of "fireproof" coal in the present war.

The coal situation shows no change for the better and in fact is growing steadily worse, with prospects of real trouble ahead in the continued absence of agreements, Administrator Ickes declared Oct. 14. Stocks of bituminous coal were down to 75,000,000 tons and there were no anthracite reserves, which meant a total deficit of 30,000,000 tons. This deficit was being increased at a rate of 500,000 tons weekly, production at present lagging by that amount below "what is necessary to carry us through," Mr. Ickes declared.

Institution of the six-day week had resulted in increased output, said Mr. Ickes, and "if we got an 8½-hour day, we would expect to get greater production. And if we don't get it, there will be trouble ahead on the railroads and in industry." Export of coal, he stated, must be continued to supply the needs of our armed forces and those of our allies. He emphasized that it was for this purpose and not for the Italian people that coal was being sent into the Mediterranean area.

N.C.A. Blames Absenteeism

Commenting on Mr. Ickes' pessimistic view of the coal situation, the National Coal Association pointed out that absenteeism plays an important part in the failure of production to reach the level it should. For instance, says N.C.A., in one of the large districts absenteeism for the week of Sept. 25 ranged from 10.8 to 29 percent, with an over-all average of 15.3 percent and a net loss of over 100,000 tons for that district alone. Another district is reported as having had an absenteeism of 16 percent, resulting in a loss of about 41,000 tons of coal. A smaller district reported that absenteeism caused a loss of 11,200 tons for the same week. Ten percent absenteeism was reported by another district, with a loss of 60,000 tons, which was aided by two local strikes. A group of mines report only about 51 percent of the men working the full six days and an overall absenteeism of 14 percent. Another district lost 7,500 man-days, or about 37,000 tons of output, and still another district lost 4,352 man-days. Absenteeism in one district ranged from 9 to 26 percent; in another from 11 to 17 percent, and still others ranged from 12 to 25 percent.

Supplementing previous measures, Mr. Ickes announced Oct. 8 the launching of a fuel efficiency program to combat wasteful practices in the use of coal, coke, wood, petroleum and gas. Emphasis will be placed first on commercial and industrial plants, with the program to be expanded later to include small consumers, home owners and others.

Dr. R. R. Sayers, Director of the Bureau of Mines, said Mr. Ickes, has named from private industry a National Fuel Efficiency Council of twelve engineers outstanding in the field of fuel utilization to chart and direct the campaign in cooperation with the Bureau of Mines. In a preliminary meeting, at which the engineers pledged their services and outlined tentative plans, the council estimated conservatively that industrial, commercial, and domestic users annually could save 29,000,000 tons of coal alone by adopting known methods of efficient utilization.

Members of the council are Thomas C. Cheasley (chairman), new supervising engineer of the Bureau's National Fuel Efficiency Section, who for the last 13 years has been fuel engineer for the Sinclair Coal Co., Kansas City, Mo.; O. F. Campbell, East Chicago, Ind., combustion engineer, Sinclair Refining Co.; W. G. Christy, Jersey City, N. J., smoke abatement engineer, Hudson County Department of Smoke Regulation; C. F. Hardy, Cincinnati, Ohio, manager, Fuel Engineering Division, Appalachian Coals, Inc.; H. K. Kugel, Washington, D. C., smoke regulation engineer, District of Columbia; L. S. Reagan, Tulsa, Okla., vice president, Webster Engineering Co.; C. A. Reed, Washington, D. C., director, engineering department, National Coal Association; H. J. Rose, Primos, Pa., vice president in charge of research, Anthracite Industries, Inc.; R. A. Sherman, Columbus, Ohio, supervisor, Fuels Division, Battelle Memorial Institute; A. W. Thorson, Washington, D. C., head conversion engineer, Solid Fuels Administration for War; J. E. Tobey, New York City, managing director, Coal Bureau, Upper Monongahela Valley Association; and an ex-officio member, J. F. Barkley, Washington, D. C., chief, Division of Solid Fuels Utilization for War, Bureau of Mines.

Tentative plans call for the organization of subcommittees of engineers to carry out the program at regional and local levels. Hundreds of engineers already have expressed their willingness to cooperate. The assistance of national engineering societies and other organizations also is being sought. The council will depend primarily upon education and training of industrial and domestic consumers to achieve results.

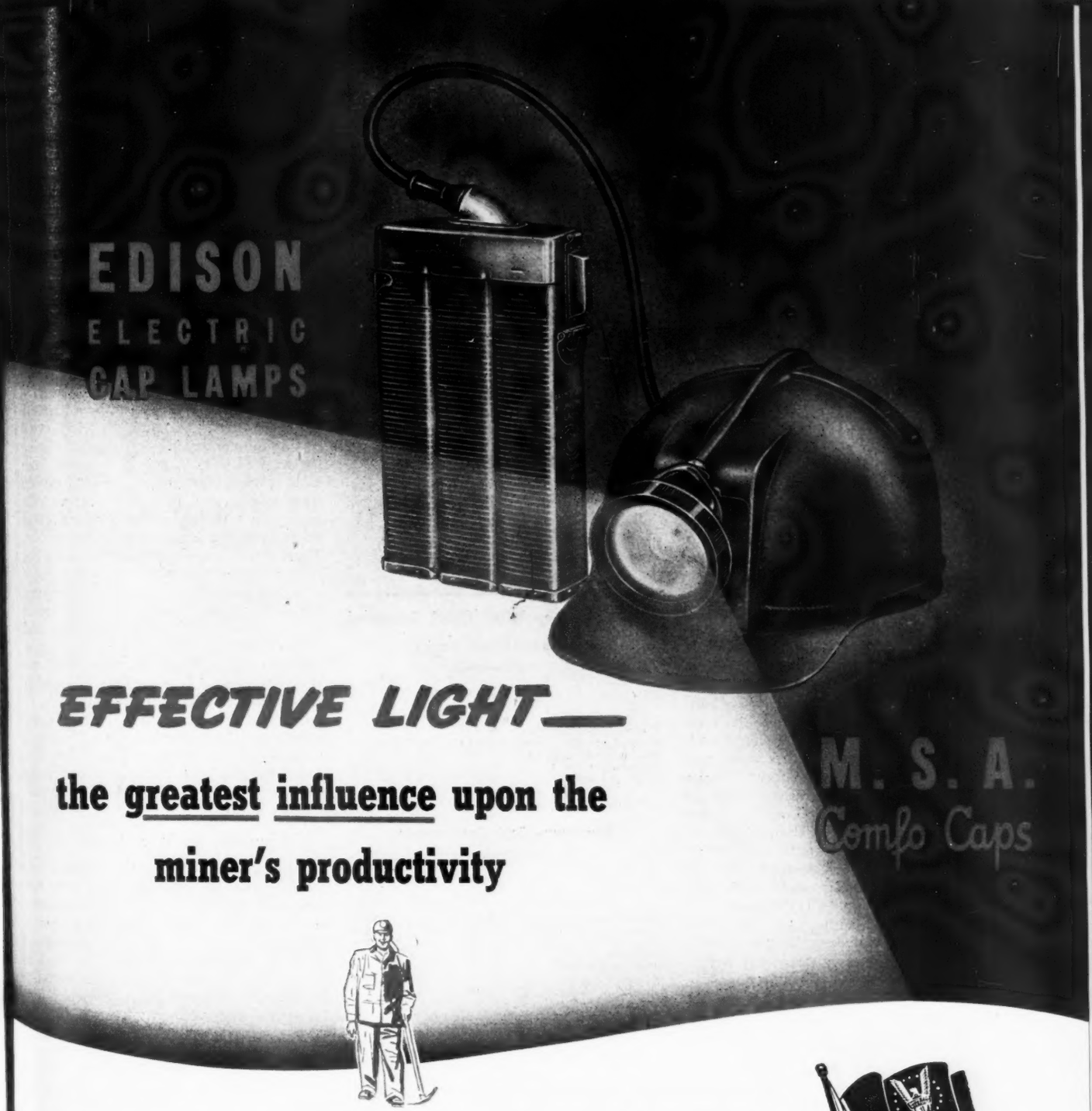
Further implementing the program, Mr. Ickes announced, Oct. 14, the appointment of 62 engineers to serve SFA without compensation in general consultation and field survey work solely in connection with engineering problems involving utilization of coal. The engineers, connected with coal and railroad companies, who have accepted appointment to assist the administration, remain free to continue their regular occupations. Their services will be available to industrial consumers who desire advice on combustion problems in their plants. To facilitate contact with other government agencies, J. E. Tobey, 122 East 42d St., has been designated as chief consultant in the New York area and Vernon G. Leach, 231 LaSalle St., as chief consultant in the Chicago area.

With the rate of lake dumpings promising achievement of goals for the Northwest before the season's end, with shipments to New England showing a tendency to improve and with coal tonnage moving from Hampton Roads rising, indications were that some trouble spots were being taken care of. The situation in the Far West, however, continued critical, as did the domestic supply in many sections of the country, especially those relying on anthracite. As a result, dealers were further urged to voluntarily arrange shipments and deliveries to make sure that no user went without, while anthracite, in particular, worked hard to whip its distribution plans into shape under the terms of the 90-percent-delivery restriction imposed some weeks ago.

Open-Top Equipment Scarce

Transportation remained adequate, although the railroads were handicapped by a limited supply of open-top equipment. This has resulted in a nip-and-tuck battle to handle the greatest overland coal movement in the country's history, ODT reported. Only by constantly shifting cars from one road to another are the carriers able to meet current demands, the agency stated. All shippers and receivers were urged to load and unload cars as rapidly as possible to prevent a shortage at the mines.

Receivers in parts of New England and New York were given further relief by OPA, Oct 11, from increases in transportation costs resulting from wartime conditions. This step was taken to assure adequate supplies of coal in the affected regions. Affected are receivers of bituminous coal in northern Maine and New York, now being forced to utilize all-rail instead of the cheaper water transportation, and dealers in Pennsylvania anthracite south of Portsmouth, N. H., having rail connections but forced to receive by water. The change also provides for absorption of trucking costs where an eligible receiver without rail connections is compelled to use trucks from the nearest railroad siding.



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MINE SAFETY APPLIANCES COMPANY

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While producers and wholesalers were being directed to channel shipments into various regions reporting anthracite shortages, dealers in 12 northeastern states and the District of Columbia were authorized, Oct. 15, by O.P.A. to give first call in scheduling deliveries to customers having little or no anthracite in their bins. The action is an emergency measure taken to spread the limited supply so that every householder will have at least some coal when cold weather comes.

The change modifies the original O.P.A. delivery limitation order which provided a system of priorities for deliveries of anthracite and required delivery first to customers having on hand less than one-fourth of the amount they used last year. Even though a customer has less than one-fourth of the amount used last year in his bin, a dealer now may refuse to deliver to him until he has taken care of other customers who have still less coal or none at all.

A new regulation—No. 5—giving a preference to orders for pea and chestnut anthracite for heating poultry brooders and hatcheries was issued in October. Orders from operators of brooders and hatcheries for the two sizes will be given preference over orders from other consumers, if the additional coal does not bring the buyer's total supply over 90 days.

Wholesale coal dealers have been instructed to increase the quantity of anthracite which will be shipped in the next six months to various communities in New Jersey to meet increased needs, Mr. Ickes announced Oct. 15. Every dealer in each community will receive the same percentage increase in his tonnage. Similar upward adjustments are being made in other states. This step followed an earlier announcement of the allocation of 218,000 tons of anthracite in domestic sizes during October to correct deficiencies in distribution. Fifty producers and wholesalers were directed to supply 194,000 tons to 27 other wholesalers before Oct. 31. The balance of the October allocation was to be distributed to meet emergency needs, for extra requirements of the armed services and to correct other shortages that might occur during the month.

Soft Coal Supplements Hard

Supplies of anthracite for household use are being supplemented by shipments of domestic sizes of low-volatile bituminous coal, Mr. Ickes said Oct. 3. Anthracite dealers who require the alternative coal have been instructed to present requests for domestic sizes of bituminous coal to the Regional Anthracite Distribution manager for their area. In making these requests, they are to state that the bituminous coal is to be used only for the replacement of anthracite in domestic sizes where hard coal is not immediately available. Mr. Ickes emphasized that anthracite dealers should distribute the bituminous coal furnished them to customers who have little or no coal to start the burning season, providing each with enough to meet immediate needs only. The coal is not being furnished to supplement supplies of consumers with ample coal on hand, he said.

Farmers using anthracite in growing or preparing crops or stock for market may obtain the coal they need without regard to the limitation on deliveries in the Northeast, OPA announced Oct. 20, placing farm operations on the same basis as industrial operations.

Bituminous coal consumers supplied from commercial docks on the Great Lakes will be furnished with enough coal—and only enough—to carry them through the winter and late spring, Mr. Ickes said Oct. 18. These directions telegraphed to dock operators, the Administrator said, should result in a more equitable distribution of the available coal supplies that are being rushed up the lakes in an endeavor to get the maximum quantity possible delivered to the lake docks before winter halts navigation. Coal for domestic space heating is not affected by the action. The dock operators were instructed to fill orders for byproduct and other special-purpose coals to the extent necessary to build stocks to meet consumer requirements until June 15, 1944, and for all other bituminous coal users to the point where their stocks will be sufficient until May 31, 1944. Shipments of more than these amounts are prohibited without specific direction.

Keeping Step With Coal Demand

Bituminous Coal Stocks

	Thousands Net Tons Sept. 1 1943	P.C. Change From Aug. 1 1943	P.C. Change From Sept. 1 1942
Electric power utilities	18,882	+1.0	+ 3.9
Byproduct coke ovens	6,811	−0.1	−33.5
Steel and rolling mills	940	+2.4	−23.8
Railroads (Class 1)	13,393	+6.5	− 0.5
Other industrials*	28,487	−2.1	− 5.3
Total	68,513	−0.1	− 6.4

Bituminous Coal Consumption

	Thousands Net Tons Aug. 1943	P.C. Change From July 1943	P.C. Change From Aug. 1942
Electric power utilities	6,924	+6.8	+22.1
Byproduct coke ovens	7,768	+3.7	+ 3.4
Steel and rolling mills	858	+0.5	+11.6
Railroads (Class 1)	10,376	+1.8	+10.8
Other industrials*	11,755	−3.1	+ 3.4
Total	37,681	+1.4	+ 8.6

*Includes beehive ovens, manufactured-gas plants and cement mills.

Coal Production

Bituminous

Month of September, 1943, net tons	51,840,000
P.c. change from Sept., 1942	+4.0
Jan.-Sept., 1943, net tons	440,974,000
P.c. change from Jan.-Sept., 1942	+1.9

Anthracite

Month of September, 1943, net tons	5,441,000
P.c. change from Sept., 1942	−0.3
Jan.-Sept., 1943, net tons	45,904,000
P.c. change from Jan.-Sept., 1942	+0.4

Sales of Domestic Stokers Vs. Oil Burners

	Coal Stokers	Oil Burners
August, 1943	2,696	910
P.c. change from Aug. 1942	−66.1	−56.8
January-August, 1943	16,839	12,078
P.c. change from Jan.-Aug., 1943	−74.7	−72.3

Index to Business Activity*

Week ended Oct. 16	212.3
P.c. change from month earlier	0.0
P.c. change from year earlier	+12.5

* *Business Week*, Oct. 23.

Electric Power Output †

Week ended Oct. 16, kw.-hr.	4,382,268,000
P.c. change from month earlier	+0.6
P.c. change from year earlier	+17.9

† Edison Electric Institute.

Moving to relieve a critical shortage of bituminous coal for household heating in several areas, Mr. Ickes announced Oct. 18 that an order had been issued to more than 1,800 coal operators in ten of the nation's principal producing districts to ship an entire day's output to all-rail retailers from whom they then had unfilled orders. The telegraphic order, signed by Howard A. Gray, Deputy Solids Fuel Administrator, was received by the producers over the Oct. 16 week-end, so that production schedules could be arranged to provide maximum tonnages of prepared sizes. It was estimated that between 300,000 and 400,000 tons of coal would be made available for sale by retailers to customers who use the coal for space heating.

The text of the order was as follows:

"Pursuant to Solid Fuels Administration for War Regulation No. 1 you are directed to ship on one day of your selection during the week of Oct. 18 to 23, inclusive, from each of your mines to your all-rail dealers from whom you now have orders, the entire day's production of all sizes other than screenings covered by such orders. These directions take precedence over, but shall not otherwise alter, requirements of all other regulations, orders or directives. You are required to notify your retail dealer customer of these directions and advise him that shipments are made pursuant to Solids Fuels Administration for War directions. Advise me by mail number of cars shipped and shipping date."

The order was sent to bituminous producers in Pennsylvania, West Virginia, Kentucky, Ohio, northern Tennessee, Virginia, Indiana and Illinois, where more than 80 percent of the nation's coal production is obtained.

Supplies for War Workers

Supplemental emergency bituminous coal supplies are being directed into the congested Hampton Roads communities of Virginia to supply immediate home heating needs of war workers, Administrator Ickes announced Oct. 21. The coal is to be routed to retail dealers in Norfolk, Portsmouth, Newport News, Phoebus and Hampton. The supply is meant to furnish these workers in the area now without coal with enough to carry them through mid-November, when the Great Lakes navigation usually closes and the eastern domestic bituminous coal situation is expected to become much easier.

As government agencies and coal dealer and consumer groups were working out a permanent program to take care of the solid-fuel needs of New York City through the coming winter, a flood of "no heat" complaints from apartment dwellers were registered with the Health Department, Oct. 5, when the temperature dropped to 45 deg. OPA, representatives of coal dealers, the Health Department and SFA said they needed several weeks more to organize their program to assure adequate distribution of coal throughout the winter to take care of emergency cases. A temporary committee of dealers had already been set up to take care of the need of customers who because of change of address or other circumstance have no regular dealers.

According to the New York fuel-oil trade, recent statements by government

ONE OF A SERIES OF SUGGESTIONS TO AID PRODUCTION

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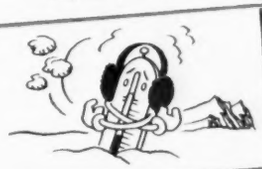
HIGH TEMPERATURE	OVER 400° F.		Gargoyle Grease BRB4 Gargoyle Sovarex Grease
EXCESSIVE WATER	WATER-FLOODED BEARINGS		Gargoyle Grease AA Gargoyle Sovarex Grease
EXTREME SPEEDS	20,000 TO 50,000 R. P. M.		Gargoyle Grease BRB4 (for ball bearings)
HIGH PRESSURES	MEETS MOST SEVERE STEEL MILL USE		Gargoyle Grease Sovarex L
LOW TEMPERATURE	−40° F.		Gargoyle Mobilgrease Zero
WIDE TEMPERATURE RANGE	+250° F. TO −60° F.		[Name on Request]

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SOCONY-VACUUM

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officials emphasizing the seriousness of the coal shortage started a movement among householders to reconvert to oil. "In general it will not be easier to buy fuel oil than coal this winter in the ration area," said OPA, "and therefore it will not be to the advantage of a consumer who has converted from oil to coal to reconvert back to oil. Fuel-oil rations will not be issued, except in extreme hardship cases, for equipment reconverted from coal to the use of fuel oil."

Fuel-oil rations will be granted to consumers using more than 10,000 gal. a year regardless of whether their equipment can be altered to the use of coal, OPA announced Oct. 1. This marks the last of several steps taken since May to suspend the year-old conversion program. Although the fuel-oil situation remains serious, said OPA, the supply of coal is at a point where the short supplies of both, in relation to existing heating equipment, are in balance. In this situation it was considered desirable to suspend the program of converting equipment from oil to coal.

Relaxation of conversion pressure was extended to industrial users Oct. 19, when Mr. Ickes advised them to forego further changes. This action affects industrial consumers in 17 eastern and 15 midwestern states, and was taken as a result of an increase in fuel-oil stocks to a satisfactory level. The industrial conversion program, as a result, was suspended Sept. 23, although announcement was delayed until Oct. 19. The Petroleum Administration for War emphasized, however, that only heavy, residual-type fuel was involved, as distillate oils of the type used in homes continues in short supply and must continue to be conserved.

Threat of Coupon Rationing

Retail coal dealers in Philadelphia were given notice, Sept. 30, that OPA would institute coupon rationing of coal "within 24 hours" if they failed to cooperate or if existing restrictions proved inadequate to prevent suffering. While the existing limitation order provides for delivery to dealers of not more than 90 percent of the amount they received last year, the dealers estimated they were not receiving more than 75 percent in most cases.

Bituminous-consuming communities in various parts of the country also took steps to assure adequate coal supplies. In St. Louis, Mo., as an example, a number of coal dealers testified before a special aldermanic committee that there should be some relaxation in the enforcement of the city's smoke control ordinance to permit a greater use of nearby southern Illinois coal and bring relief in the very serious fuel shortage existing in the city. Alderman George N. Daugherty, committee chairman, indicated that the committee may consider some relaxation of the present rules so that coal with a slightly higher content of volatile matter might be permitted for hand-firing. The present rigid provisions of the city ordinance prohibit hand-firing of coal with more than 23 percent volatile matter.

Smoke Commissioner Robert M. Boyles is opposed to any relaxation of the smoke control ordinance and is against a return to Illinois coal, it was indicated in his questioning of the president of a coal firm who said that he was only one of the 20 members of the Authorized Fuel Dealers' Association, who are track dealers, in favor of the repeal of the present ordinance. Meantime city officials of Ferguson, in St. Louis County, are issuing permits for the use of Illinois coal containing more than 23 percent volatile matter.

Establishment of a central coal depot to receive and allocate fuel orders of residents of the Louisville (Ky.) area was voted, Oct. 1, by representatives of 45 companies. Purpose of the depot, approved by the ODT and WMC, is to serve new coal users who have moved to the area recently with the least possible expenditure of manpower and a minimum of depreciation on trucks and equipment. Under this plan, coal dealers would accept no orders from new customers but would refer them to the offices of the depot.

While SFA proceeded against one company, a number of reports of shipment of "fireproof" coal were received by various authorities in October. Commenting on these reports Oct 13, Frank W. Earnest Jr., Anthracite Industries, Inc., declared that responsible producers are "cooperating with government officials in doing everything possible to eliminate substandard anthracite." SFA announced, Oct. 16, that one Pennsylvania anthracite producer had "been prohibited from shipping any more coal unless its quality meets certain minimum specifications. The action, first of its kind by SFA, will be followed by any others necessary to assure that the quality of anthracite is maintained at standards which are fair to consumers," Mr. Ickes declared.

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Personal Notes

PAUL M. BARLOW left his position as electrical engineer in the State Department of Mines of West Virginia on Oct. 1 to join the staff of the Carbide & Carbon Chemicals Corp. as electrical engineer in the mechanical test, inspection and fire protection department at South Charleston, W. Va.

HENRY BENTE, formerly machine shop foreman in the shops of the Pittsburgh Coal Co., has been made general shop foreman.

J. W. CONRAD, sales representative in Philadelphia since 1932 for the Davis Coal & Coke Co., Baltimore, Md., has been appointed sales agent in Philadelphia for the company, with offices in the Land Title Building.

DAVID H. DEVONALD was elected vice president in charge of operations of the Peabody Coal Co. at a meeting of the board of directors Oct. 19. He will direct the operation of all the company's coal mines, located in Illinois, Indiana, Kentucky and West Virginia, producing a total of about 13,000,000 annually. Associated with the company continuously since the start of his business career in 1915, he had been general superintendent since May 1, 1941.

David H. Devonald

CECIL L. GIBBS, assistant traffic manager of the Birmingham-Southern R.R., has been named assistant traffic manager of the Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., effective Oct. 18.

OTTO GORECK, assistant foreman in the Warden mine of the Pittsburgh Coal Co., Sutersville, Pa., has been transferred to the Mongah mine, Monongahela, Pa., in the same capacity.

GEORGE GRAY, hitherto master mechanic in the Pittsburgh Coal Co. shops, has been made a designing engineer in the engineering department.

W. G. HIPPARD, formerly chief engineer of the Republic Steel Corp. coal mines at Uniontown, Pa., has been made general superintendent of the company's mines in the southern district, with headquarters in Birmingham, Ala. This is a new post and includes supervision of Sayreton Nos. 1 and 2 mines, Birmingham; Virginia mine, near Bessemer, and Sayre mine, Sayre, Ala.

EMIL B. KEENAN has resigned from the U. S. Bureau of Mines, Mineral Security Division, as senior mining engineer, to return to his former employment in private industry.

JOHN KMETZ, fireboss at the Warden mine of the Pittsburgh Coal Co., Sutersville, Pa., has been made assistant foreman there.

JOHN KRIVDA, heretofore fireboss at Banning No. 1 mine of the Pittsburgh Coal Co., Van Meter, Pa., has been promoted to assistant foreman at that operation.

B. P. MANLEY, executive secretary of the Utah Coal Operators' Association and formerly coal mining company executive in Utah, has been chosen chairman of the advisory council of the Salt Lake City Chamber of Commerce.

DAVE MEREDITH, formerly assistant foreman at the Lindley mine of the Pittsburgh Coal Co., Houston, Pa., has been made general assistant foreman.

RAYMOND MORGAN, mine foreman at Olyphant colliery of the Hudson Coal Co., Olyphant, Pa., has been appointed assistant

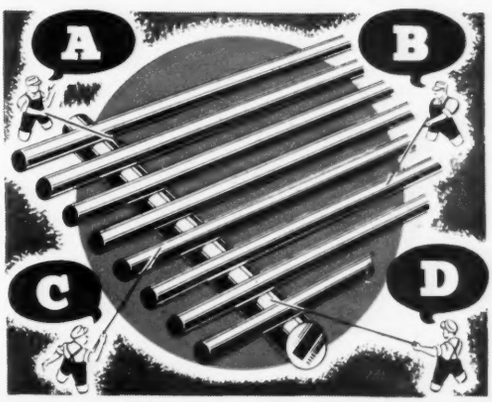
IN SCREENING OPERATIONS WITH "BEE-ZEE" SCREENS

Less coal waste and longer life are two of the reasons "Bee Zee" Round-Rod Coal Preparation Screens are being demanded in more and more operations. And these are vital advantages with today's urgent need for coal. "Bee Zee" screens check waste because openings between rods are maintained — there's less wear with round-rod design. Also, extra hard, wear resistant alloys are used because the rods are not bent in fabrication. "Bee Zee" Screens have served 3 to 4 years under steady, hard use with screen openings still accurately maintained. They're built in many designs for all sizing, dewatering and drying equipment. Take advantage of the savings they offer. Write today for full information and literature.

Advantages of "BEE-ZEE" Screens

A—Sides of rod get negligible wear, accurate opening maintained because minimum weight applied between rods. **B**—Rods are not sharply bent, or deformed—extra hard alloys can be used. **C**—Abrasion from coal weight occurs on top of rods, eliminating wear at opening. **D**—Opening remains continuous over supporting rods, avoiding blind spots.

Proved Long Life In Leading Coal Plants Everywhere



BIXBY-ZIMMER ENGINEERING CO.
961 Abingdon St. • GALESBURG, ILL.

colliery superintendent there, vice Walter B. Petzold, promoted.

WILLIAM M. OSBORNE, formerly vice president, has been elected president of the Youghiogheny & Ohio Coal Co., Cleveland, Ohio, vice W. L. Robison, deceased. JAMES M. OSBORNE has been elected vice president to succeed the late Harry L. Findlay. Other vice presidents newly elected are S. H. COLE, CHARLES R. WRIGHT and C. H. OSBORNE. W. L. FREY, formerly secretary, has been made secretary and treasurer.

P. R. PAULICK has resigned as general superintendent of the Akron Coal Co., operating in Guernsey County, Ohio, to resume practice as consulting mine mechanization engineer, which was interrupted when he joined the Akron staff. Before going into consulting work he was chief engineer for the Powhatan Mining Co.

WALTER B. PETZOLD, assistant colliery superintendent at Olyphant colliery of the Hudson Coal Co., Olyphant, Pa., has been appointed assistant mining engineer, vice Edward W. Stahl, deceased.

A. G. RICHARDSON, formerly superintendent of preparation for the Elk Horn Coal Corp. and section foreman for the Inland Steel Co., Wheelwright, Ky., has accepted a position as safety and preparation engineer with the Dickinson Fuel Co., Charleston, W. Va., and will reside at Dickinson Estate, Malden, W. Va.

J. J. SEILER, division engineer for the Pittsburgh Coal Co., has been made superintendent of stripping.

WILBUR STUTZMAN, hitherto mechanic at Montour No. 4 mine of the Pittsburgh Coal Co., Lawrence, Pa., has been promoted to maintenance foreman.

HOWARD J. THOMAS, Birmingham, Ala., has resigned his connection with the Alta Coal Division of the Southern Cotton Oil Co. and the Consolidated Coal Co. to become area distribution manager for the Solid Fuels Administration for War, District 13.

JOE WOODWARD, foreman for the Consolidation Coal Co., Jenkins, Ky., has accepted a similar position with the West Virginia Coal & Coke Corp., Omar, W. Va.

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Award Saunders Medal To G. B. Harrington

George B. Harrington, president, Chicago, Wilmington & Franklin Coal Co., Chicago, was awarded the 1944 William Lawrence Saunders Gold Medal, for "distinguished achievement in mining," at a meeting of the board of directors of the American Institute of Mining and Metallurgical Engineers held Oct. 19 at the Hotel Sherman, Chicago. Mr. Harrington is the 14th recipient of this award, which was established in 1927, through a gift by Mr. Saunders for the recognition of distinguished achievement in mining, in which is included the production of metals, coal and other non-metallic minerals.

The 1944 award will be formally presented to Mr. Harrington at the annual

George B. Harrington

meeting of the institute in New York City in February, 1944.

Mr. Harrington has had long and extensive experience in mining, joining C.W.&F. in 1914. Graduated from Princeton University in 1902 and from Massachusetts Institute of Technology in 1904, his first mining experience was gained in Mexico, in the State of Sonora, in 1904. Later he returned to the United States and entered the coal field.

In presenting Mr. Harrington's name to the board of directors, M. D. Cooper, chairman of Medal Committee, who is divisional superintendent of the Hillman Coal & Coke Co., Pittsburgh, Pa., offered the following citation: "For distinguished achievement in mining of coal, as shown, especially, in his leadership of a great company, in which organization, efficient engineering, design and management have been so combined that it stands preeminent in the mining industry."

•

Last Mines Returned; Federal Control Ends

Government operation of coal mines ceased Oct. 12 when Secretary Ickes, as Coal Administrator, turned back to private owners the 1,700 coal mines remaining under federal control. With the announcement that "we are now out of the coal-mining business," Mr. Ickes said the Coal Mines Administration would be liquidated immediately. The agency was established last July to operate the 3,300 mines taken over by the government on May 1, when failure of mines and operators to agree on a new wage contract had caused a suspension of production.

Approximately 1,600 mines had been returned to private ownership previously, the first group having been restored to the control of their owners on Aug. 20.

Mr. Ickes lauded the work of Carl E. Newton, deputy coal administrator, and members of his staff, who are resigning.

"I want to express my thanks to Mr. Newton for having left his important post as president of the Chesapeake & Ohio Ry. in Cleveland to come here in this emergency to share an extremely heavy load," Mr. Ickes said. "To him and his hard-working staff, who are resigning with him, I say, 'you have served your country well.'"

Secretary Ickes' order reads:

"On the basis of available information and evidence, and after consideration of all the circumstances, and in accordance with the provisions of the War Labor Disputes Act of June 25, 1943 (Pub. No. 89, 78th Congress, 1st sess.), I find that the possession and control by the government of any and all of the coal mines now in the possession of the government should be terminated.

"Accordingly I order and direct that possession and control by the government of any and all mines now in the possession of the government, including any and all real estate and personal property, franchises, rights, facilities, funds and other assets used in connection with the operation of such mines and the distribution and sale of their products, be, and they are hereby, terminated."

•

Pond Creek-Tug River Group Has Safety Day

McVeigh team, captained by Harold Brogan, took first place in the mine rescue contest held Oct. 8 on the "Circus Lot" in Kentucky across the State line from Williamson, W. Va. Second was the Hardy team, headed by Elmer Queen; third, the Stone team, under D. D. Hinkle. All three teams represented the Eastern Coal Corp.

In the first-aid test, Oct. 9, the standing was: First, New Alma Coal Co., McCarr, Ky.; second, Eastern Coal Corp., Hardy (Ky.) team; third, Eastern Coal Corp., McVeigh (Ky.) team; fourth, Pond Creek Collieries Co., Goody, Ky.

The meet was sponsored by the Pond Creek-Tug River Mining Institute with the cooperation of the U. S. Bureau of Mines, Kentucky Department of Mines and Minerals, and the United Mine Workers.

•

Big Sandy-Elkhorn Holds Safety Meet

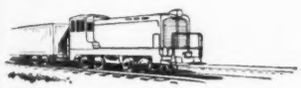
Inland Steel Co. team, Wheelright, Ky., took first honors in the mine-rescue contest of the Big Sandy-Elkhorn safety meet, held Oct. 2 and 3 at Pikeville, Ky. The team from the Seco (Ky.) mine of the South-East Coal Co. led in the first-aid contest, followed by the group from Esco No. 10 mine of the Utilities Elkhorn Coal Co., Esco, Ky. Second place in the mine-rescue contest went to 204 mine of the Consolidation Coal Co., Jenkins, Ky. First place in the colored first-aid contest went to Mine 204, Consolidation Coal Co. The boys' contest was won by the Inland Steel Co. team.

A total of $1,555 in cash, plus ribbons and cups, went to the various teams as prizes.

GOULD BATTERIES HAVE EARNED THEIR SERVICE STRIPES IN SERVING AMERICAN INDUSTRY

Back in the days when storage batteries were known as "accumulators" Gould began manufacturing batteries to meet specific needs. Today Gould batteries have earned their service stripes in every type of American industry.

The Rochester Telephone Company of Rochester, N. Y., like many of the nations' telephone systems, uses Gould batteries to maintain a constant supply of current for their telephone operations.



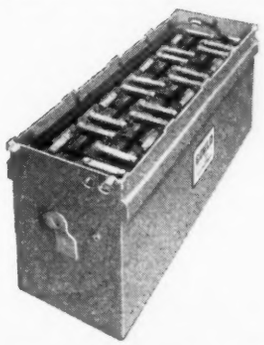
Among the many American railroad companies employing Gould batteries in Deisel switch engines and for other important operations is the Chicago, Burlington & Quincy R. R.

In factories and warehouses of numerous manufacturers like the American Can Company, Gould batteries supply power for platform trucks, tractors, skid lift trucks, and any eletric vehicle used for materials handling.

Gould Storage batteries are standing by in the Doctor's Hospital of Washington, D. C., and other leading hospitals to insure light and power in case of service failure.

The Koppers Coal Company of Grantown, W. Va., is but one of the many mining companies depending on Gould batteries to supply motive power to mine locomotives and shuttle cars.

Gould storage batteries are meeting the rigid standards of the United States government in delivering power for fire control on battleships, for the under-water propulsion of submarines and by our air forces for every battery application.



SPECIFY GOULD KATHANODE . . . The original spun glass battery tested by twenty years of actual service.

Rated Conservatively . . . Goulds equal or exceed in capacity any battery of comparable size and cell structure.

GOULD STORAGE BATTERY CORPORATION, DEPEW, NEW YORK

Builders of industrial batteries for every application. Sales and service offices in principal cities of the U. S. A.

Factories at Depew, N. Y., North Bergen, N. J., Dallas, Atlanta, Chicago, St. Paul, Leavenworth, Los Angeles

FOR EXCELLENCE IN STORAGE BATTERY PRODUCTION AT DEPEW PLANT

GOULD

Since 1898 THE BATTERY PICKED BY ENGINEERS

PUT IT ON THE RECORD

One of a series of service suggestions for users of industrial batteries.

▶ Battery life can be greatly extended when accurate records of individual cell voltages, gravities and water consumption are continuously maintained. So important to battery life is the compilation of complete records, that Gould employs a staff of service men, who are charged with the responsibility of helping customers to install a service record system to meet their needs.

Records are the eyes of battery service. For example, an individual cell in an industrial truck battery owned by a large battery user, showed up on the record as having a voltage at variance with other cells in the same battery. As time went on this difference became more and more pronounced, and a Gould service man was called in. Upon inspection, a cracked separator was uncovered as being the cause of the trouble, whereupon it was replaced and the battery put back into service within two hours.

By contrast, where records were not kept, another case of a similar nature was not discovered until a routine Gould service call was made. The cell in this battery had been worked beyond the point of reversal. Sulphation had set in, and the element had to be replaced.

Here you have an example of actual saving in man-hours and materials achieved through the use of an up-to-date battery service record system.

Modern record systems will always lengthen life and improve operating efficiency. The control engineer knows the importance of a record system. Battery records are a part of his business. All floating batteries in his charge may last 8 or 16 years depending upon a very slight variance of cell voltage.

We would like you to know the Gould men who will take care of your industrial storage battery requirements.

Serving the Upper Ohio River area are S. E. Gane located in the Fifth & Grant Building, Pittsburgh, and E. J. Schneider, whose office is at 105 E. Third St., Room 202, Cincinnati, Ohio. In this same area Gould is represented by E. J. Boyle of the E. J. Boyle Co., Fifth & Grant Building, Pittsburgh, Pa., and F. R. Prather of the Rawlplug-Cincinnati Co., 105 E. Third St. Cincinnati, Ohio.

N.C.A. Analyzes Bituminous-Coal Outlook

Wartime Manpower and Equipment Problems Hold the Spotlight With Research and Public Relations for the Future at N.C.A.'s 1943 Meeting

GATHERING for their first wartime session at Cleveland, Ohio, Oct. 14-15, members of the National Coal Association heard a United States Senator, an economist and a retiring government official all urge them to greater effort, both for the production of coal and for the preservation of private enterprise. With proceedings revolving around association activities, coal's future, research and public relations, the general theme of the conference, unexpressed but evident throughout the two-day convention, the first since 1939, was "Coal has done a fine job, but the hardest part lies ahead."

The association elected Fred S. McConnell, president, Enos Coal Mining Co., Cleveland, as its president to succeed Charles C. Dickinson, president, Dickinson Fuel Co., Charleston, W. Va., who had served for four years.

Carl E. Newton, who described himself as a government official in the process of liquidation, reviewed the work of the Coal Mines Administration, of which he was deputy administrator, and emphasized that lack of a labor contract was hampering the coal industry in its fight for war production.

Lauds Production Effort

"Great credit is due your industry," Mr. Newton said, "for the production that has been achieved this year in the face of all the difficulties which have confronted it. Since April you have operated in the absence of a wage contract with increasing loss of manpower and under a number of handicaps.

"Despite all the obstacles confronting you, you have produced more coal this year than you did last year. That in itself is a highly creditable accomplishment. But it is not enough.

"The current rate of production is about 12 million tons weekly, or about half a million tons short of what is necessary to round out a 600,000,000-ton production by the year's end. So it is clear that an added measure of effort must be exerted if the full national requirements for the current year are to be met.

"And the grave problems that confronted your industry still confront it. An industry wage agreement—which is the keystone to a solution of the fundamental problems—is still lacking, and shortages of manpower and materials are increasing."

Mr. Newton emphasized that the government had tried to operate the mines with a minimum of directives and regulation and with only one object: continued production. He gave some hint of further troubles to come for the industry, when he said he had been under "heavy pressures" to advance federal money to distressed companies.

"I am able to say to you today," he declared, "as I did to the American Mining Congress last July, that the Coal Mines Administration did not advance one dollar to any mining company. The easiest way out for the Coal Mines Administration, of course, would have been to accede to these pressures for federal money. But that would have put a great part of the coal industry heavily in debt to the government, and to my mind would have placed the industry far on the road to a perpetuation of government control and an ultimate nationalization of the industry."

United States Senator Albert W. Hawkes (R., N.J.), former president of the United States Chamber of Commerce, was the main speaker at the dinner Oct. 14 and told the association it was up to its members to decide whether they wanted free enterprise or continued government regulation.

"I know the coal-mining industry has gotten used to government help in the solution of some of its problems. It is not for me to tell you in the coal business how far you should go in securing or accepting government regulation of the pricing of coal. I assure you that if you are to remain an integral part of the free-enterprise system you must accept your own burdens and problems in connection with your own rights and opportunities.

"Your representatives in Congress or in your State legislatures cannot solve these problems for you unless you rise en masse and assert your rights as citizens and stand out in the limelight, regardless of reprisals. You must fight to maintain the system which is the objective of millions of our boys now fighting throughout the world. You coal operators have got to choose whether you want free enterprise or government control of industry. You cannot have both."

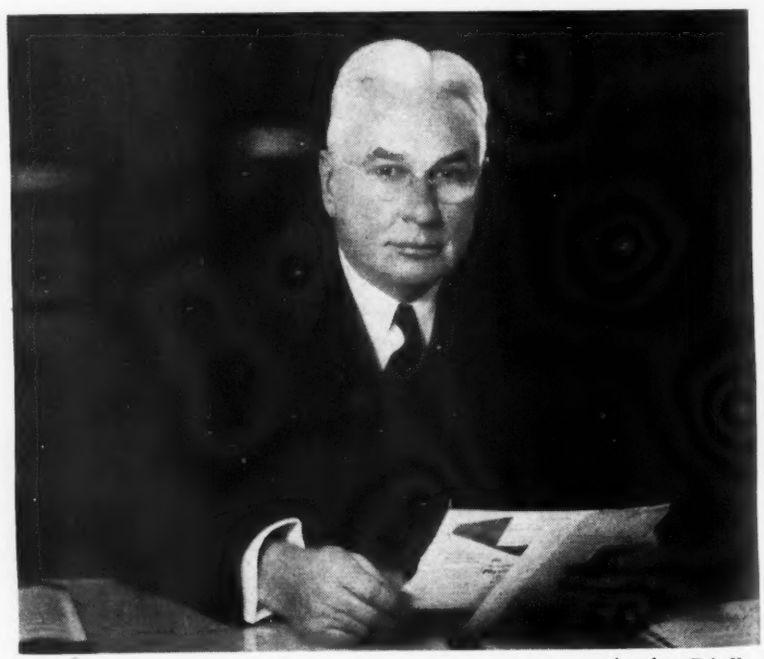
E. H. Davis, president, New York Coal Co., Columbus, Ohio, was toastmaster in the absence of R. L. Ireland, president, Hanna Coal Co., Cleveland, who was detained in Washington.

Urges Planning for Freedom

Taking as his topic "The Frame of the Future," Virgil Jordan, president, National Industrial Conference Board, called for a "plan for freedom" and a revival of thinking at his talk at the Oct. 14 luncheon session. "Though it may not seem to have much meaning or substance to most of us today," Dr. Jordan said, "in all our planning for the future let us remember to plan for freedom, for freedom is the master plan that will finally prevail over every other."

The two-day session opened with a report by President Dickinson in which he pointed out that members of bituminous industry had stuck to their task no matter what the difficulties and obstacles.

"We have had," said Mr. Dickinson, "scarcity scares, threats of rationing with six weeks' supply of coal above ground and resulting encouragement of coal hoarding, strikes for higher wages in the face of government restrictions against increasing wages that were already above the 'Little Steel' formula, the exciting of labor through misleading statements by those



American Foto News

New N.C.A. president—Fred S. McConnell.

Baker Gradebuilder helps maintain uniform output from strip mine!*

A North Cambria County, Pa., strip mine has succeeded in maintaining regular daily production in stripping narrow outcrops in areas which have been largely mined underground, by the balanced distribution of stripping and loading with its two shovels, supplemented by a Baker Gradebuilder mounted on an Allis-Chalmers Model "L" gasoline tractor.

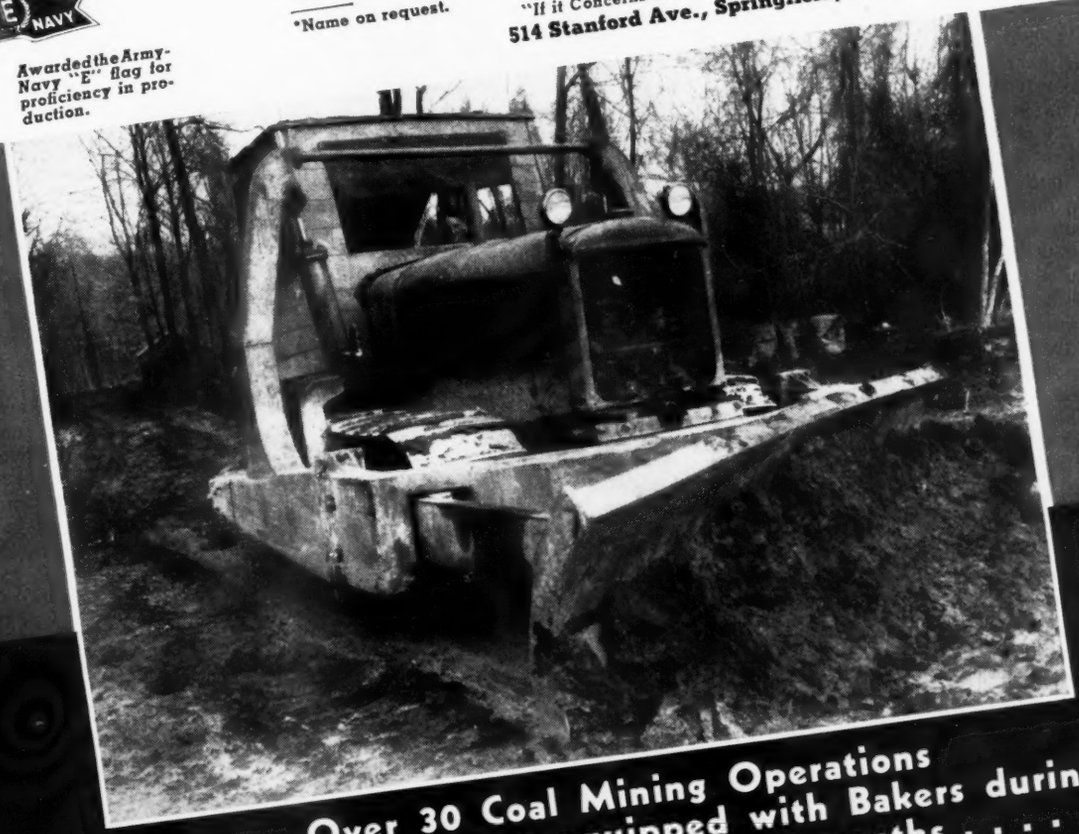
As is the case at many other coal operations, this unit is a tool-of-all-work. It grades access roads, speedily cleans the top of the coal seams, pulls equipment and does some stripping of top coal.

The versatility of the Baker Gradebuilder makes it a profitable investment in any coal field. The full weight of the tractor front end can be exerted on the cutting blade by the fast, direct, positive hydraulic cylinders. No cumbersome superstructure; no cables or sheaves to wear; no clutch or brake bands to replace. Low maintenance is assured by a minimum of parts. The Gradebuilder moldboard can be quickly angled to left or right, tilted or readily replaced with a bulldozer moldboard for extensive leveling operations. It cuts new trails on sharp inclines, casting the material to the down side. Where a Baker Gradebuilder goes to work, stripping costs go down.

*Name on request.

THE BAKER MFG. CO.
"If it Concerns Victory, it Concerns Us"
514 Stanford Ave., Springfield, Ill.

Awarded the Army-Navy "E" flag for proficiency in production.



Over 30 Coal Mining Operations have equipped with Bakers during the past 18 months . . . . . .

BAKER

The Modern Tractor Equipment Line for
EARTH MOVING
LEVELING AND GRADE BUILDING
SNOW REMOVAL
ROAD MAINTENANCE

in high places in time of war and conflicts of authority and opinion among Washington bureaus, but the members of the bituminous industry have stuck with their task of mining coal and, but for the lack of manpower or the refusal to work, there would be a stockpile of over a hundred million tons of bituminous coal above ground at this time as compared with a normal peace-time inventory of forty million tons."

Mr. Dickinson said there was a national average of 15 percent absenteeism, perhaps 20 percent, among productive workers, and declared that if it could be reduced to 8 percent, there would be sufficient manpower for the production of 13,000,000 tons of bituminous a week, more than enough to meet "the most extravagant estimate of our country's needs."

In fact, "if a solution could be found for this one problem, the questions of increased production, rationing and hoarding and scarcity scares would disappear in thin air."

Coal the Immediate Task

Reviewing the work of the association over the last four years, John D. Battle, executive secretary, told of its activities in taxation, opposition to government subsidy of competitive fuels, and help to members on questions of machinery priorities. "Our immediate task," Mr. Battle said, "is to do everything within our power to get out the coal so vital to the war effort. We don't have to drum up trade at the present time, but now is none too soon to begin to plan for the postwar era, and one of the things which we are trying to do now is to make friends for coal when we get back to normalcy, on the assumption that we will live to see that day."

Mr. Ireland, reporting for the committee on employee relations, told of work on the federal mine inspection bill and of intercession before the Selective Service System on a schedule of essential occupations. "The manpower problem," Mr. Ireland declared, "is now a most serious one and in this connection it is my opinion that this conference could very well express some conclusions with respect to this entire subject, as it is, of course, well known by all concerned that further loss of miners, either to the armed forces or other industries, will retard production and this will seriously and adversely affect the war effort."

Taxation, declared Charles O'Neill, president, United Eastern Coal Sales Corp., New York, "is a growing question of great moment to every American citizen and the coal industry in particular." Mr. O'Neill said that the work of the government relations committee, which he heads, had been devoted almost exclusively to taxation. He urged that the association create a committee of tax experts, since "taxation in this country is no longer just a matter that can be handled by an ordinary group of business men, though it must be, in my opinion, directed by a business man."

Continued opposition to government subsidy of competitive fuels was reported by Grant Stauffer, president, Hume-Sinclair Coal Mining Co., Kansas City, Mo., chairman of the committee on government subsidies of competing energies. Mr. Stauffer said the association had continued to combat the St. Lawrence Seaway project but had not intervened in construction of gas and oil lines because of war conditions, although, he said, some of those "came very close" to government subsidy.

"It is my recommendation," Mr. Stauffer reported, "that this organization continue to oppose all subsidized plans and that it protect the interests of the coal industry wherever possible in connection with the construction of facilities that would further jeopardize the coal markets of this country."

The treasurer's report was read by Charles A. Owen, president, Imperial Coal Corp., New York City, in the absence of Col. William D. Ord, because of illness. Mr. Owen also reported for the committee on interstate and foreign commerce and related how the committee had been influential in "unfreezing" 117 overage ships for reconditioning. "Export coal business," he said, "from a tonnage standpoint has suffered in no small degree. As a matter of fact there is relatively little activity in the export coal trade at the present time, other than to Canada. For the next few months there probably will be even fewer ships available for carrying coal, although the long-term prospects for shipping large tonnages in the future are, I believe, relatively good."

C. C. Dickinson, retiring N.C.A. president.

The committee also studied the increased use of diesel locomotives, and is continuing its investigations, and intervened in the railroads' request before the Interstate Commerce Commission in 1941 for a general rate increase. The increase was granted in part, but subsequently revoked until December at the request of OPA.

The association adopted a number of resolutions, among them opposition to the St. Lawrence Seaway, opposition to the levying of social security or old age taxes for anything except those specific purposes, and a reaffirmation of the industry's pledge to the President of the United States "to continue to mine the coal required to supply the fuel demands of wartime industry".

Mr. McConnell, in accepting the presidency, called for a "militant but at the same time forward-looking and constructive attitude" on the part of the industry. "I believe that teamwork will pull us through," he said. "Without it, I am doubtful."

The afternoon session on Thursday, Oct. 14, was given over to reports on research, with talks by E. G. Bailey, vice president in charge of engineering, Babcock & Wilcox Co., New York City, and Howard N. Eavenson, president, Bituminous Coal Research, Inc. Mr. Bailey listed nine subjects which he believed should be the objectives of immediate research by the bituminous industry and six others which he said should be the subject for liaison work with other industries and organizations.

The nine immediate goals were: house heating equipment, equipment for units up to 5,000 lb. an hour; complete gasification of coal; adaptation of coal to metallurgical and ceramic furnaces, making the handling and burning of coal clean; determining the best equipment for efficiency, more economical handling from tipple to stoker, maintaining one or more laboratories for study of coal, gas and ash; investigation of the true economics of coal preparation with a view to ultimate shipment of all coal as run of mine crushed to a size suitable for use in equipment already developed.

Projects for Joint Action

For liaison work, Mr. Bailey listed large steam generating units, large-capacity stokers, pulverizers and pulverized coal firing systems, locomotives, coke and gas manufacture, and chemicals of the kind to be derived from coal, and coal and ash products. Two subjects should be reserved for later study. They were processing of motor fuels, and gas turbines and other forms of direct power from coal or coal products.

Mr. Eavenson said Bituminous Coal Research was now engaged on the following subjects: dustless treatment, the development of smokeless stoves, automatic residential heating, year-round air-conditioning, utilization of coal in the process industries, overfire air jets, railroad locomotives, power from coal, gasification of coal and mining problems.

"The present program of research," he said, "is the largest that has ever been supported by the bituminous coal industry and has broader support than any previous program. A total of 350 producing companies are now subscribing at the standard rate.

"There are many problems confronting the coal industry in which research can be very helpful and we now have a going research organization which can well handle them and which should be used by the industry to a much greater capacity than it is."

Merchandising and public relations were the topics of the Friday morning session, Oct. 15. Using experience gained in Minneapolis and St. Paul as a basis, Better Home Heating, Inc., showed how fuel merchants there had combated the growth

"THE FIRST WORD IN CONSTRUCTION ..... THE LAST WORD IN WEAR!"

"Big Fist" Brand Coal Shovels are the very *first word in construction* . . . designed to meet the exact requirements of experienced coal miners...equipped with exclusive features developed by WOOD and found only in WOOD made Shovels.

"Big Fist" Brand Coal Shovels are the *last word in wear*... blades made of special analysis alloy steel . . . XX grade handles of specially selected, thoroughly seasoned timber . . . reinforced with the steel I-Beam . . . an exclusive extra-wear feature.

● This brand on the handle means *extra* wear in the Shovel.

THE STEEL I-BEAM HANDLE REINFORCEMENT

The finest exclusive extra-service feature found in shovels.

WOOD SHOVEL AND TOOL COMPANY

PIQUA, OHIO

A NATIONAL ORGANIZATION SPECIALIZING EXCLUSIVELY IN SHOVELS, SPADES AND SCOOPS

of competitive fuels in the domestic and steam markets.

E. O. Steele, managing director of the group, presented a slide lecture on how the organization was formed and what it has accomplished. The program was broken down into two main phases, cooperation among coal dealers and education. The third phase was salesmanship, which included personal selling, group selling, advertising and public relations.

J. P. Williams Jr., president, Koppers Co., Pittsburgh, described the formation of Bituminous Coal Institute, the industry's new public relations group, and declared: "There is a big job ahead of us in enlightening the public as to the true conditions [in the industry] and, once accomplished, I am sure this will pay large dividends in getting fairer treatment from our legislative bodies, our labor representatives and our customers." Mr. Williams said operators representing 122,000,000 tons had so far subscribed to the institute and that the first year's budget of $500,000 would be divided about as follows:

New York office and organization	$70,000
Public relations	100,000
Advertising	250,000
Special preparation	37,000
Contingencies	43,000

Bituminous coal's program and its accomplishments to date were presented by the institute's general manager, Harry M. Vawter. Using *Coal Age*'s September public relations survey as a basis, Mr. Vawter said that "despite the magnificent job which the bituminous coal industry has done in meeting the demands occasioned by the war, the industry finds itself today still harassed by a multitude of unfavorable factors which belittle its accomplishments and continue to present it to the public as a backward industry, perpetually at odds with its employees, greedy, uncooperative with government and incapable of playing an essential part in the war effort."

The institute's program is designed to convey these three broad statements to the public: "That the bituminous coal industry is well managed, alert to its responsibilities to employee, to the public, to the government; that bituminous coal is—and will continue to be—the best and cheapest source of energy and heat the world has ever known; that a steady production of bituminous coal is too important, in war or peace, for the industry to be made a political football for publicity seeking politicians."

Mr. Vawter displayed magazine advertisements based on the theme "Public Energy No. 1" and newspaper clippings on the industry to illustrate future plans and past accomplishments.

"That the job will be slow and tedious," he said, "is due to the fact that it has been so long neglected. We must start literally at the beginning and lay our foundations so surely and firmly that we shall never have to go back to undo any part of our work. But the job can be done and will be done without question."

•

COMING MEETINGS

- **Harlan County Coal Operators' Association: annual meeting, Nov. 17, Harlan, Ky.**
- **Coal Mining Institute of America: annual meeting, Dec. 9 and 10, Fort Pitt Hotel, Pittsburgh, Pa.**
- **American Society of Heating and Ventilating Engineers: 50th annual meeting, Jan. 31, Feb. 1 and 2, 1944, Hotel Pennsylvania, New York City.**

Bituminous Coal Leaders

Fred S. McConnell, president, Enos Coal Mining Co., Cleveland, was elected president of the National Coal Association at 1943 meeting. Mr. McConnell succeeds C. C. Dickinson, president, Dickinson Fuel Co., Charleston, W. Va. Other officers are:

Vice presidents, L. Ebersole Gaines, president, New River Co., Mt. Hope, W. Va.; Charles A. Owen, president, Imperial Coal Corp., New York; K. A. Spencer, president, Pittsburg & Midway Coal Mining Co., Kansas City, Mo.

Treasurer, William D. Ord, Washington (reelected).

Executive secretary, John D. Battle, Washington (reelected).

Assistant secretary and treasurer, C. C. Crowe, Washington (reelected).

New members of board of directors:

S. Harvey Blount, general manager, Central Service Co., Des Moines, Iowa; H. D. Everett, president, Winding Gulf Collieries, Charleston, W. Va.; Henry G. Schmidt, president, Powhatan Mining Co., Cleveland; R. E. Snoberger, executive vice president, Binkley Coal Co., Chicago; Laurence E. Tierney Jr., president, Eastern Coal Corp., Bluefield, W. Va.; Henry C. Woods, vice president, Sahara Coal Co., Chicago.

Directors returned to office, in addition to Messrs. Dickinson, Gaines, Owen and Spencer, were:

W. L. Affelder, vice president, Hillman Coal & Coke Co., Pittsburgh; O. L. Alexander, president, Pocahontas Fuel Co., Inc., New York City; L. G. Ball, president, J. H. Weaver Co., Philadelphia; J. G. Bradley, president, Elk River Coal & Lumber Co., Dundon, W. Va.

J. E. Butler, president, Stearns Coal & Lumber Co., Stearns, Ky.; Heath S. Clark, president, Rochester & Pittsburgh Coal Co., Indiana, Pa.; E. H. Davis, president, New York Coal Co., Columbus, Ohio; Henry T. DeBardeleben, president, DeBardeleben Coal Corp., Birmingham, Ala.

J. D. Francis, president, Island Creek Coal Co., Huntington, W. Va.; R. S. Graham, president, Kemmerer Gem Coal Co., Norton, Va.; George B. Harrington, president, Chicago, Wilmington & Franklin Coal Co., Chicago.

Moroni Heiner, president, Utah Fuel Co., Salt Lake City, Utah; Calvin Holmes, president, Holmes-Darst Coal Corp., Knoxville, Tenn.; R. L. Ireland Jr., president, Hanna Coal Co., Cleveland; R. E. Jamison, vice president, Jamison Coal & Coke Co., Greensburg, Pa.

W. J. Jenkins, president, Consolidated Coal Co., St. Louis, Mo.; R. H. Knode, president, Stonega Coke & Coal Co., Philadelphia; George J. Leahy, vice president, Little Betty Mining Corp., Chicago; George H. Love, president, Union Collieries Co., Oakmont, Pa.

Hooper Love, president, West Kentucky Coal Co., Earlington, Ky.; Crawford C. Madeira, vice president, Rockhill Coal Co., Philadelphia; E. C. Mahan, president, Southern Coal & Coke Co., Knoxville, Tenn.; Douglas Millard, manager of sales, fuel and byproducts division, Colorado Fuel & Iron Corp., Denver.

J. B. Morrow, president, Pittsburgh Coal Co., Pittsburgh; Charles O'Neill, president, United Eastern Coal Sales Corp., New York; D. H. Pape, president, Sheridan-Wyoming Coal Co., Monarch, Wyo.

George W. Reed, vice president, Peabody Coal Co., Chicago; W. C. Shank, president, Crowe Coal Co., Kansas City, Mo.; J. Noble Snider, vice president, Consolidation Coal Co., New York.

Grant Stauffer, president, Sinclair Coal Co., Kansas City, Mo.; Arthur B. Stewart, president, Davis Coal & Coke Co., Baltimore; J. P. Williams Jr., vice president, Koppers Coal Division, Eastern Gas and Fuel Associates, Pittsburgh; L. E. Woods, president, Crystal Block Coal & Coke Co., Huntington, W. Va.

The following were named to the executive committee:

Messrs. McConnell (chairman), Alexander, Clark, Dickinson, Francis, Harrington, Ireland, Jamison, Mahan, Stauffer and Williams.

Hard Coal Bootlegging Ordered to End Nov. 30

Bootleg mining, which pestered Pennsylvania's hard-coal industry for more than a decade, must come to a close by the end of November, the State's authracite committee decreed Oct. 15.

"Trespassing on lands and stealing of coal will be outlawed in the anthracite region after Nov. 30 in the same manner that stealing is outlawed in any other community," said D. Leonard Corgan, secretary-treasurer of the quasi-governmental agency.

Closing of the bootleg mines, which produced about 2,000,000 tons of fuel this year, will have "very little effect upon coal supply and will cause no appreciable decrease in the amount of coal being shipped," said E. R. Hintz, executive secretary of the Pennsylvania Coal Dealers' Exchange.

Born in the depression, bootleg mining is now concentrated in Schuylkill and Northumberland counties, in the southern anthracite fields. At the start of the war there were about 11,000 anthracite bootleggers. There are now only 2,000.

Million dollar coal preparation plant at the Victory Mine, Pyramid Coal Corporation near Terre Haute, Indiana, where Indiana No. 3 seam coal is mined. The conveyor from the mine slopes 18° above ground and 16° underground. The conveyor is approximately 700 ft. long of which about 500 ft. is underground. Capacity 600 tons per hour at 375 ft. per min.

Rip ¼ mile long in conveyor belt repaired with FLEXCO HD RIP PLATES and BELT FASTENERS

IN any type of material handling service an unforeseen accident may damage a conveyor belt and result in a costly service interruption unless the belt can be repaired without delay. In such cases Flexco HD Rip Plates and Belt Fasteners frequently save the day.

Such was the case at the Victory Mine of the Pyramid Coal Corporation where a heavy jack pipe inadvertently left in one of the mine cars ripped the 8 ply 48" conveyor belt for a distance of 1450 ft. The accompanying pictures show how the Pyramid Coal Corporation and the local Industrial Distributor restored the belt to service without a serious loss in production. The repair crew had the belt back in service within 30 hours after the accident.

If you operate conveyor belts and are not familiar with the use of Flexco HD Belt Fasteners and Rip Plates you should know about them for they may help you out of a difficult situation. We shall be pleased to send you bulletin F-100.

BULLETIN NO. F-100 gives complete information and prices on Flexco HD Belt Fasteners and Rip Plates with detailed information on how to fasten or repair conveyor belts in any thickness from ¼" and up and in any width.

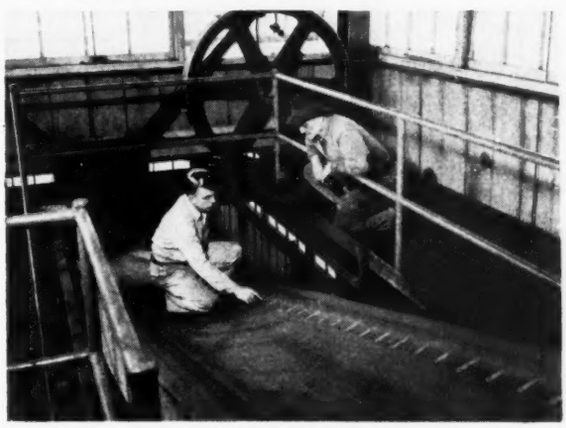
Write for your copy

FLEXIBLE STEEL LACING CO.
4638 Lexington Street, Chicago 44, Illinois

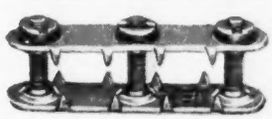
★

Sole manufacturers of ALLIGATOR STEEL BELT LACING for transmission belts ● FLEXCO HD BELT FASTENERS AND RIP PLATES for conveyor belts ● ALLIGATOR V-BELT FASTENERS ● ALLIGATOR BELT CUTTERS

The illustration above shows the crew repairing a portion of the belt where the upper plies ripped and then the tear offset a few inches and the lower plies were ripped. Two rows of fasteners and rip plates were required for repairing this section of the belt. The rip was first "tacked" together every few feet with a rip plate.



The above illustration shows the fasteners and rip plates applied to a portion of the belt where the rip was clean and straight.



Flexco HD Rip Plate

Flexco HD Belt Fastener

In repairing the 48" conveyor belt 4600 Flexco HD Belt Fasteners and Rip Plates, as illustrated above, were used.

Flexco HD belt Fasteners and Rip Plates sold by supply houses everywhere

Holding Roof and Promoting Safety Spirit

Roof-Fall Injuries and Timbering for Their Prevention Canvassed by Safety Congress, Along With Bumps and How to Instill Safety Spirit

STEEL-AND-WOOD crossbar and wood prop combinations for supporting the roof while leaving unrestricted space for mechanical loading in driving headings and rooms and removing pillars in flat-coal workings, as devised by the Pittsburgh Coal Co., were explained by R. H. Nicholas, chief inspector for the company, at the meeting of the National Safety Congress in Chicago, Oct. 5-6, also devoted to a statistical analysis of roof-fall accidents, the cause and prevention of bumps and methods of instilling a safety spirit in mine employees.

The many flat beds being mined throughout the country, said Mr. Nicholas, always will require many different methods of timbering and there is no intention to suggest that these patterns be adopted generally. Workmen seldom are injured after a working place has been timbered completely in the manner described for the operation of the mine of which it is a part, but injuries will occur between starting a new cut and preparing for the next one, because hand loaders only too often will take chances and finish loading a car before setting a much needed post, and because machine-loading crews will try to finish filling the last car or two rather than stop to place supports.

In hand-loading, the place generally is timbered as close to the face as possible before the new cut is started. Need for additional timber begins with the first car of coal loaded, yet direct personal supervision cannot be provided for all the many working faces that hand-loading involves. Education is the only answer; by it, the supervisor, with occasional direction, can control in a degree the actions of his men, for only on an average of about every two days is a new cut of coal made that exposes them to a roof hazard.

Machine-Loading Hazard Ten Times That of Hand-Loading—In mechanical loading, the men on every shift are working under roof that just previously covered one of five or more new cuts, and in many cases they even return to the same place for a second cut in the self-same shift. As the two men who operate the loading machine at the face will work in a single day under the roof over ten or more times as many new cuts as will the two men who are hand loading and as they are subject to the hazards arising from the undetermined quality of the roof over these cuts and, moreover, as the tempo of loading mechanically induces them to take chances, they must be provided with more protection than hand-loading workmen.

Place Crossbar Under Roof Even When Driving Headings—Immediately after coal and slate are loaded out, the load crew sets a temporary safety post about 6 ft. from the face (Fig. 1). After the crew departs, a timberman enters, examines the place thoroughly and sets a 4x6x11-ft. wood crossbar 5 ft. outby and paralleling the face, hitching one end in the rib and supporting the other end on a screwjack or a wood post. Crossbars set closer might give better support, but would be dislodged by the shot, and work would be delayed awaiting replacement, particularly as coal would be lying where the post should be set. The crossbar is moved forward with each successive cut. After the bar is set, it is wedged tightly, and the temporary safety post removed. In some mines, two bars preferably should be provided and set, the second

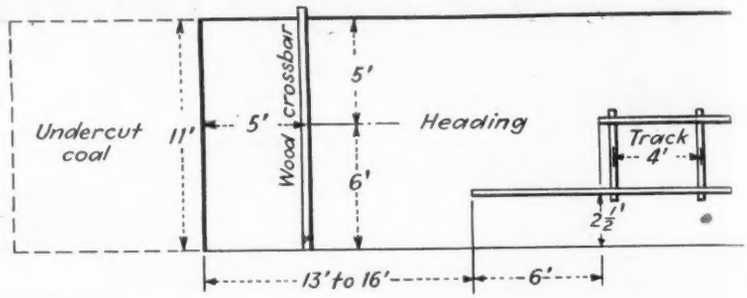


Fig. 1—Timbering face of heading (x is used to indicate post under crossbar).

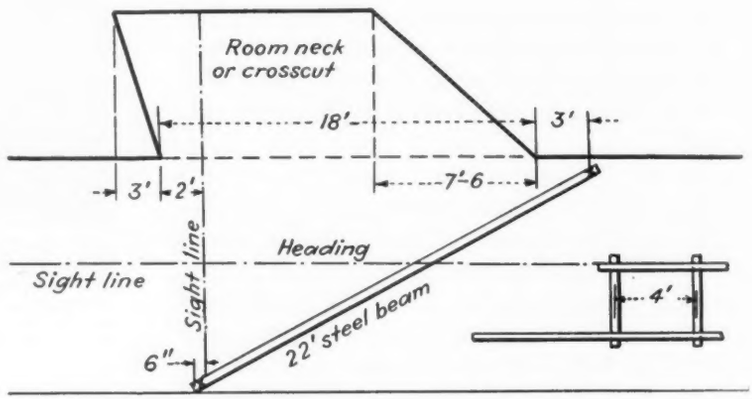


Fig. 2—Support when starting room neck from heading.

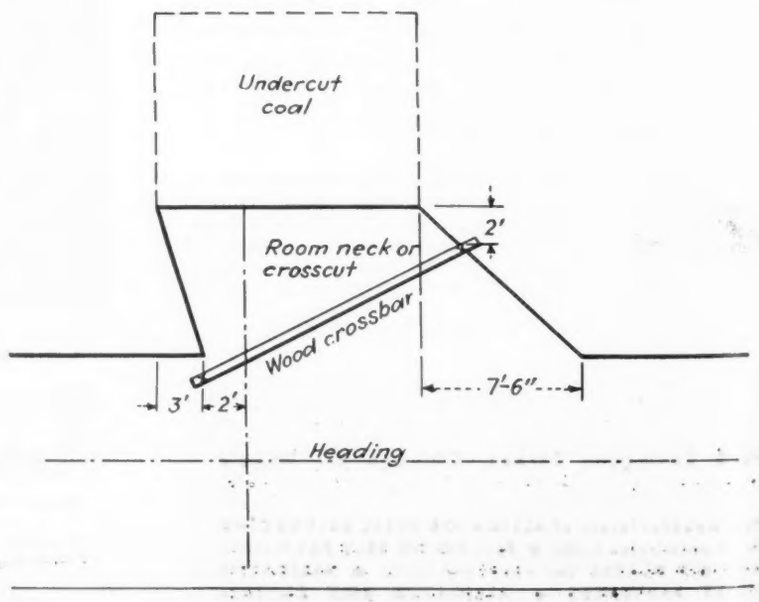


Fig. 3—Support while extending room neck.

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SEAL-TITE Tamping Bags

SEALTITE Tamping Bags offer a safer, faster, cheaper, method of sealing shots. Properly tamped holes will cut powder costs and help your blasting crew in bringing down falls. Investigate now—see why they are so widely used.

AND LOOKING FOR NEW ONES!

THE TAMPING BAG COMPANY

MOUNT VERNON, ILLINOIS

from the face being moved ahead of the first, as space becomes available and as roof has to be supported.

Support While Turning Off Room—Before even the first cut is made for a room neck or crosscut, the heading is timbered. A 4-in.x22-ft. steel H-beam is erected at an angle across the heading (Fig. 2). The outer end is placed 3 ft. outby the undercut and the inner end placed near the opposite rib. In the area between the beam and the cut, a safety post is set which may have to be moved during loading operations. The outer end of the beam is set 3 ft. outby the cut to allow clearance for operation of the loading machine.

Greater protection would be afforded if the beam were set parallel to the side of the entry, but experience shows that, thus placed, rolling coal and slate too often will dislodge it. Roof protection is essential wherever a new cut is made in the side of an old place, for if this is not done, the roof may break near the back of the cut and may pull the roof out over the roadway, especially where the headings have been standing for some time without room necks being started.

Timbering Room Neck—Here the crossbar (see Fig. 3) is hitched into the rib at a point 2 ft. outby the face. The other end extends to the inner corner of the room neck. Should the place be turned to the left, timbering is reversed, so that there will be no leg on the short side of the curve. Timberman and slateman work together to prepare a place for the cut and set the crossbar, removing the steel beam used for the first cut, cleaning up spillage and trimming slate. The same timbering procedure is followed on the succeeding cut until the room is widened and the regular room procedure has been established.

Timbering a Single-Wing Room—In the standard single-wing room, which has been adopted so as to reduce the width of the face and increase safety (see Fig. 4), the advance cut is made much narrower than the full width of the room. The standard width is 14 and it is never over 16 ft., and this width is permitted only when conditions are favorable. This type of room also favors slate handling and refuse gobbing.

The full room width depends on the length of the cutter bar used on the mining machine and on the width of the advance cut. In Fig. 4, it is shown 16 ft. wide and the wing cut is 8 ft. deep, giving a completed width of 24 ft. A 14-ft. advance cut and a 7-ft. bar make a 21-ft. room. At the mines of the Pittsburgh Coal Co. the slate over the wings is supported by straight posts with cap pieces. The slateman assists the timberman whenever bars are to be moved.

All timbers and beams are set in relation to sight lines, the timberman carrying a marked stick to lay off exact distances. When he arrives, he first sets posts A, B, C and D under the wing slate, then road posts E and F. Sometimes a third post is needed in this line; safety post G is then set.

The place is now ready for the removal of the crossbar and steel. Safety crossbar K is moved forward to K_1 within 5 ft. of the uncut face. The 22-ft. H-beam is shifted

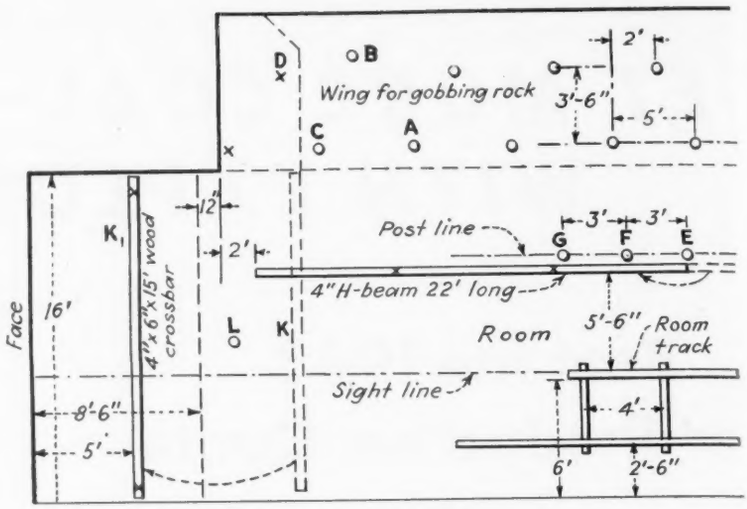

Fig. 4—Support when extending single-wing room.

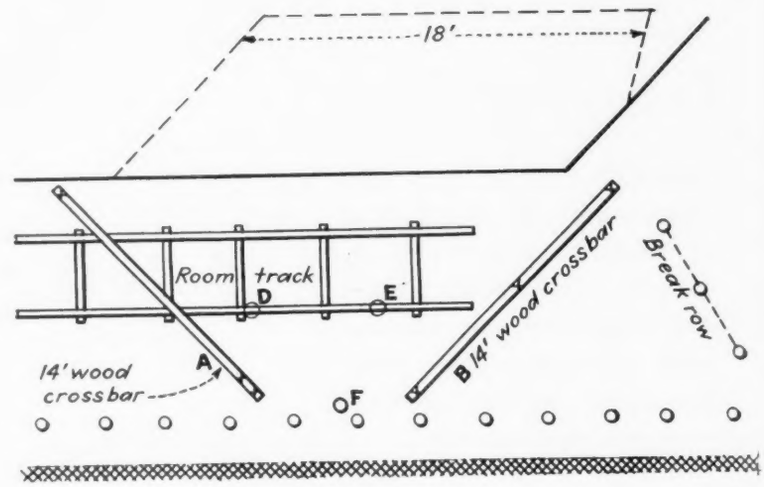

Fig. 5—Support when making first cut in crossover. *D* and *E* are set after track is removed.

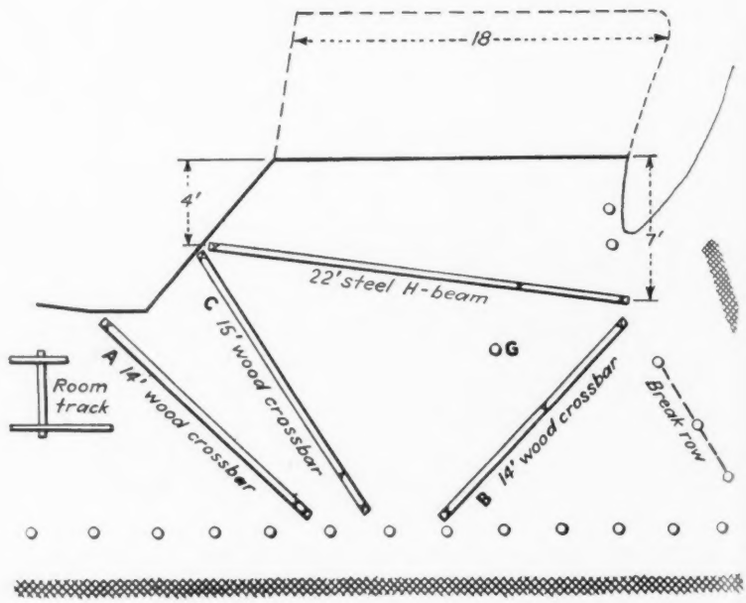

Fig. 6—Support when making second cut in crossover.

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From the Ten National Permissible Powders, all of which are new formulae, you will find one National Permissible that will prepare your coal at the face a little better than you have ever prepared it.

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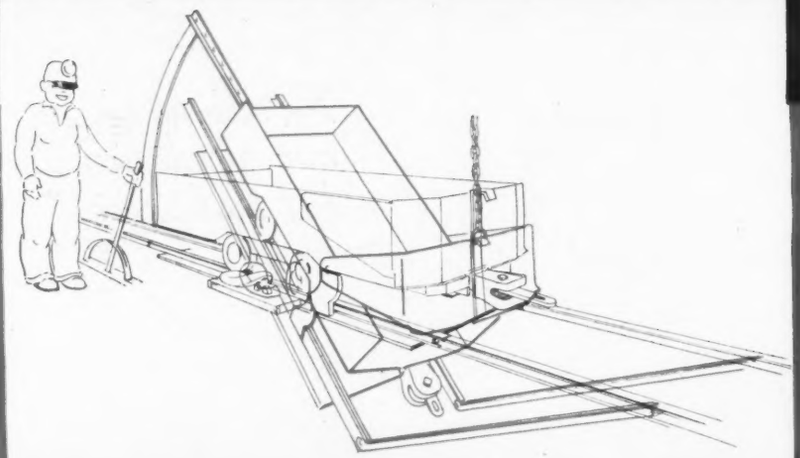

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lengthwise to its new position and the safety post G removed.

The crossbar near the face gives protection while the men are loading the cut at the advancing face and at the same time permits the machine to load without interference. Two functions are performed by the H-beam: (1) While loading it gives protection beyond the line of permanent road posts, with as few changes as possible of posts or jacks, and (2) when the slate is being gobbed by the loading machine, it supports the roof where the roof posts have been removed, thus permitting the Joy boom to be swung into the gobbing area of the room for slate disposal.

All posts and jacks must be set in their proper place and the room sight line must be advanced with each new cut. At the same time, the permanent post line also must be advanced. Machine men are responsible for advancing sight and post lines. The timberman takes his measurements from the sight line for the parallel posting, and each advancing post is measured from the last post set in line. If not set in proper position, two posts might have to be removed, whereas, if the support were made in accord with standards, coal could be loaded and slate gobbed with the removal of only one post, thus avoiding the hazard associated with such removal.

Where roof must be barred continuously, as at clay veins or other roof slips, crossbars are set and the H-beam is placed under them. As the H-beam is advanced, posts are set under ends of crossbars. This method of timbering is only a minimum, and where more posts seem to be needed they must be placed.

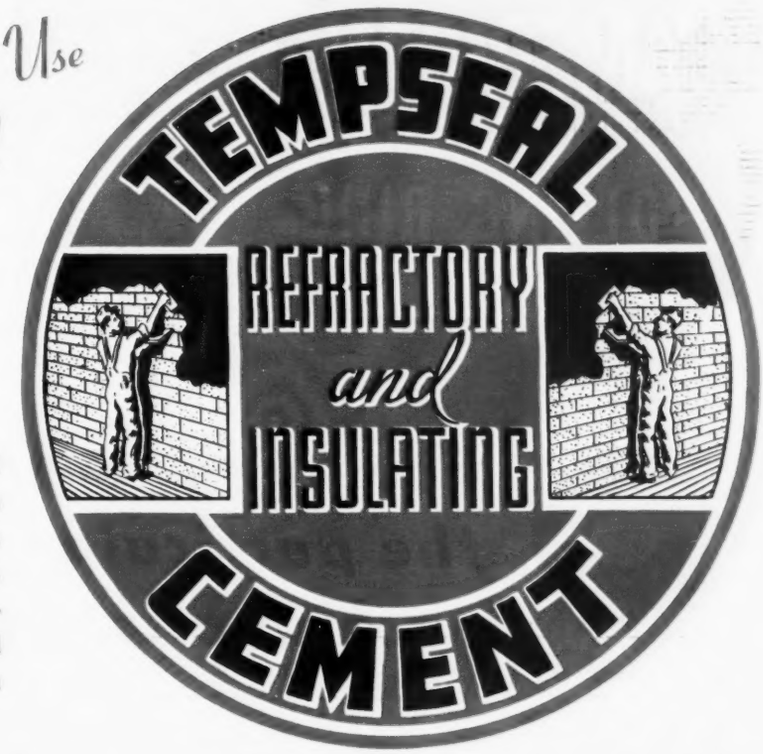
Timbering for Drawing First Cut of Pillar—Fig. 5 shows method of timbering for the first cut on the rib. This timber

LEADERS, COAL-MINING SECTION, 1943-4

Thomas Moses, ex-president, H. C. Frick Coke Co., Pittsburgh, Pa., chairman, Coal Mining Section, and also director, National Safety Council; J. T. Ryan, Jr., general manager, Mine Safety Appliances Co., Pittsburgh, Pa., vice chairman; Reese H. Nicholas, chief inspector, Pittsburgh Coal Co., Pittsburgh, Pa., secretary, with Walter N. Polakov, United Mine Workers, Washington, D. C.; John E. Jones, mining engineer, Old Ben Coal Corp., West Frankfort, Ill.; Edgar C. Weichel, mining engineer, Hudson Coal Co., Scranton, Pa.; Clyde L. Lutton, safety director, H. C. Frick Coke Co., Pittsburgh, Pa.; J. J. Forbes, chief, Mineral Production Security Division, War Production Board, Washington, D. C., as committee chairmen. George W. Grove, supervising district engineer, U. S. B. M., Pittsburgh, Pa., will act as alternate for Mr. Forbes.

A NEW DEVELOPMENT IN CEMENTS

For Interior or Exterior Use in Masonry Work, Wall and Surface Coatings



Tempseal is a new departure in industrial cement—has such a broad range of uses it is hard to visualize the plant that can find no use for it. It is a water thin coating, easily applied, and trowels readily. Moreover, it is unaffected by expansion and contraction—will not loosen or crack even with excessive vibration.

FOR SEALING PRESSURE AND TEMPERATURE

For sealing in and holding combustion gases when outside walls are coated with Tempseal, this product has been tested on temperatures up to 1500° with perfect success. Its adaptability to any kind of surface makes it valuable as a masonry cement, as well as for boiler settings, ranges, to seal air leaks, and for high temperatures.

When used in setting brick, Tempseal forms a perfect bond and absolutely prevents the escape of gases or the infiltration of air. When a wall is several courses of brick thick, it is the usual custom to use Tempseal in laying the brick on two or three outer courses, when the brick is not subjected to the intense heat of the boiler's interior.

Tempseal is highly resistant to oils, acids, alkalis, gasoline, ammonia and gases, and its Copaltite base seals against metal corrosion.

FOR WEATHERPROOFING ALL KINDS OF SURFACES

Tempseal will be found to have many exterior uses, among which are the weatherproofing of thermal insulations, roofs, tank tops, overhead ducts and pipe lines, and other surfaces exposed to the elements. It not only offers a weatherproof surface, but protects as well against damage and disintegration of expensive materials through the efforts of air infiltration, moisture, corroding fumes or abrasions.

SAVINGS OFFERED *by* TEMPSEAL

- SAVES TIME—will set and can be painted within 30 minutes after application . . . comes ready for instant application, in 5 lb, 10 lb, 25 lb and 100 lb containers.
- GOES FURTHER—20 pounds of Tempseal will cover 100 square feet, 1/16" thick and 40 lbs, 100 sq. ft. ⅛" thick.
- COSTS LESS—applications require only very thin layers, in most cases 1/16 in. thickness being sufficient, and seldom more than ⅛ in. thickness needed.

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AMERICAN
Type "S"
ROLLING RING CRUSHER

★ The pictures below show two American Pulverizer installations at United Electric Coal Company's Buckheart Mine No. 17 at Canton, Illinois. At this mine is an American Pulverizer 60-S Crusher for reducing lump and egg to 1¼". This is a special crusher and if adjusted, will step up production from normal 300 tons per hour to between 350 and 400 tons per hour producing a 4"x0 product. Also, at this mine is a model 30-S of 200 tons per hour capacity, reducing from 3" to 1¼".

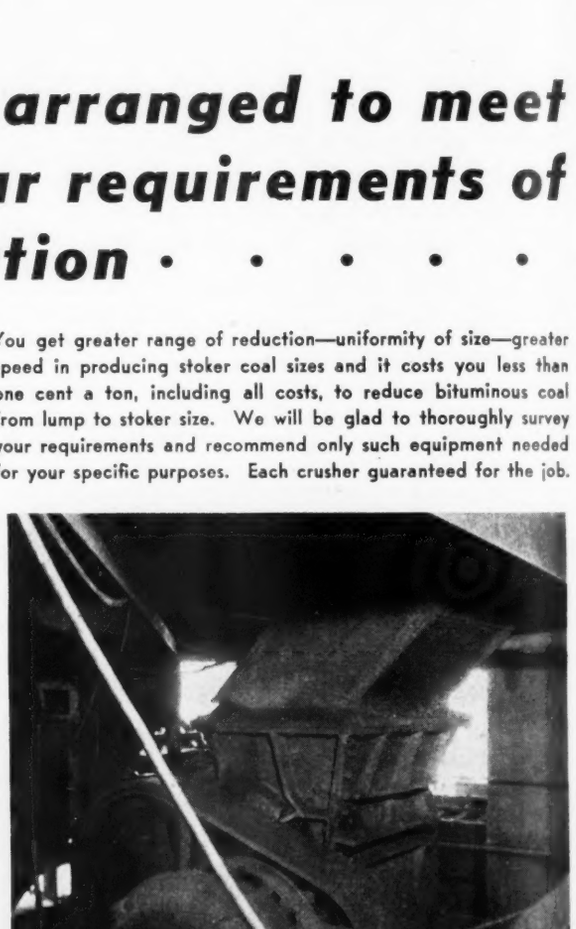
Each unit is arranged to meet the particular requirements of each application . . . . .

The splitting action of the SHREDDER RINGS shatters and distributes the coal before it reaches the Breaker and Grinding Plates.

These patented reversible manganese steel SHREDDER RINGS are found only in the American Rolling Ring Crusher. They have twenty cutting edges or teeth and are designed to maintain their outward position by centrifugal force at the specified speeds. In contact with solid metal, the rings are momentarily deflected from their usual course because they are free to swing back out of position. There are no shear pins or other safety devices that require attention

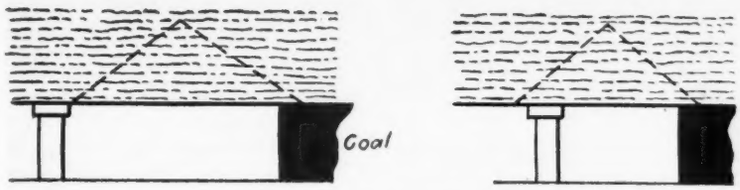
- ***EXTERNALLY ADJUSTED***
- ***EASILY ACCESSIBLE***
- ***COMPACT***

You get greater range of reduction—uniformity of size—greater speed in producing stoker coal sizes and it costs you less than one cent a ton, including all costs, to reduce bituminous coal from lump to stoker size. We will be glad to thoroughly survey your requirements and recommend only such equipment needed for your specific purposes. Each crusher guaranteed for the job.



AMERICAN PULVERIZER COMPANY 1119 MACKLIND AVENUE ST. LOUIS, MISSOURI

ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS



Timbering Creviced Rock

Fig. 7—Wrong Way.

Fig. 8—Right Way.

work is more or less permanent, for provision must be made for roof support while the coal from the rest of the cutover is being loaded and the loose slate above it is being removed. Maximum support for the roof is the first consideration, but it should be obtained with the resetting of a minimum of timber and without interfering with loading operations.

This method needs both posts and crossbars. The first operation is to set post *F*. Then is set a break row of not less than three posts. Crossbar *A* is set at 45 deg. to the direction of the room with the outer end supported by a post set from 1 to 3 ft. outby the side cut and with the other end supported by two posts for protection in case one of them is knocked out accidently. The outer end of the bar is placed sufficiently far back of the cut that it will not be in the way when loading.

Crossbar *B* also is set on a 45-deg. angle, and the lower end is set to clear the side cut. An additional post is placed in the center of this bar, which normally would not have to be set. Straight roof posts would give the same roof support, but the area between this bar and the break-row posts has to be used for gobbing refuse. For this operation, the crossbar permits the posts in that area to be changed in safety. These timbers must remain in place until the rib cutover is completed.

Steel for the Second Cut—Fig. 6 shows timbering for the second cut in a rib cutover. Crossbars *A* and *B* are still in the position in which they are placed for the first cut. The area over the roadway where the machine must gather and load has become greatly enlarged by the removal of the first cut. Roof support of a kind that does not have to be shifted is now vitally important. Roof post *G*, which will not be in the way, is set first and then follows crossbar *C*, which has its rib end about 6 ft. from the angle in that rib. The other end is placed half way between the crossbars *A* and *B*. Two posts are placed to support this end.

A steel H-beam is placed with its respective ends near crossbars *B* and *C*, the inner end being 7 ft. from the coal face. For further support, a wood post is placed under the H-beam about 6 ft. from the inner end, and this ordinarily will not have to be removed.

Between the inner end of the H-beam and the face, two pressure posts are set which are needed because the first cut removed some of the coal fender. Where the rib must be cut twice to extract it, the H-beam is moved toward the face with each succeeding cut and replaced with other timber. Pressure posts are set along the coal fender as each cut is removed.

Accidents From Roof Falls in Pitching Seams—Fatalities from all causes in the mines of the Philadelphia & Reading Coal & Iron Co. in the period 1938–1942, including both dates, figure one for every 484,136 tons, whereas the number for all anthracite and bituminous mines in the same period was one for every 405,472 tons, declared George A. Brecker, explosives engineer, delivering the address of George A. Ross, general manager.

Roof Testing and Forepoling—In testing for drummy roof in the P. & R. mines, the bare fingers of one hand must be held against the roof while it is being struck. A testing bar and not a pick held in the other hand is used for this percussion. The timber in use has diameters ranging up to 26 in. In driving gangways, the company requires forepoles in advance of the foremost set of timber. Because of this safe practice, fatalities from this source have been almost eliminated at these locations. Forepoling also is used in reopening these places. Rails suspended by steel hangers from the collar beams of a timber set are used sometimes to forepole the roof. Immediately after each cut, the rails are slid ahead and the collar is put in proper position on the rails by men standing upon the muck pile.

Fundamentals in Timbering—The most important principle of mine timbering is to timber in time. When a crack is found in the roof, the edges of the crevice should be chipped off to expose the direction of the crack. An experienced miner can then determine the proper method of timbering and the correct location for the props. Fig. 7 shows an unsafe way of timbering, and the boss should explain why a prop stood in this position will not support the roof. A prop with a good cap piece should be set on each side of the crack, as shown in Fig. 8. After the cut has been shot and the coal loaded in safety, the crack over the coal can be seen, and the miner can either set additional props under the rock or take the rock down.

Why Cushion a Prop—When the roof presses on a prop, (1) the fibers of the wood in the cap piece directly over the prop flatten and come together and take up part of the initial movement and (2) the unsupported part of the cap piece is forced down by the pressure and forms a protective ring of strong uncrushed fibers around the edge of the top of the prop, which tends to prevent it from splitting the wood, thus adding to the strength of the post (see Fig. 9).

In discussion, Richard Maize, Secretary of Mines, State of Pennsylvania, asserted that many Northern Anthracite mines operate in relatively flat beds and the miners are at the face almost the entire working day, whereas in the Southern region all the mines pitch heavily, and the coal slides down under the timber. Men working on this coal and surrounded by this timber are better protected than the men at the face of flatter beds.

Correct Working Place Approach—Men should spend some time examining the roof with an adequate light from points under the protection of the timber before venturing under rock that may be loose, declared John L. Boardman, chairman, bureau of safety, Anaconda Copper Mining Co., Butte, Mont. The scaling bar should be as light as possible, consistent with the work to be done, and (1) so long that the miner can reach the slate without having to stand under any part of the material which he has sooner or later to bring down and (2) of such length that he does not have to hold the bar directly in front of his body.

The bar should have a guard made of a piece of rubber hose to deflect any rock that might slide down it. It should be sharp with a fulcrum chisel on one end and a straight pick point on the other. Thus equipped, the miner should select a spot that can be trimmed down from his position under the timber or under a place known to be safe. After trimming down this spot, he may then advance into it and bar down radially from it. In case no such safe spot can be found, he must make one by setting a post.

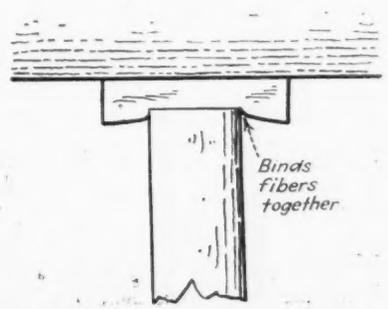


Fig. 9—How cap piece helps.

When barring down, the miner should not depend solely on his sense of hearing and determine by sounding alone whether a piece of rock is loose. He should observe closely the direction taken by slips or cracks, especially where a crack caused by blasting runs toward a slip in the rock. Such cracks and slips frequently delineate slabs so loose that they do not give the drummy sound characteristic of loose rock.

What, How, When, Where and Who—There is a distinction between an order and an admonition or instruction. On leaving a working place, a boss frequently remarks to his men: "Now, watch that rock and keep it barred down" or "make it safe and don't get hurt." Such remarks cannot be designated "safety instructions," though bosses using them sometimes assert after an accident that they instructed the injured men as to the rock that fell. A good order should tell the men (1) what they are to do, (2) how to do it, (3) when to do it, (4) where to do it and (5) who is to do it.

Statistical Analysis of Roof Falls—The annual toll of roof-fall accidents is 700 lives and 17,000 disabling injuries, as-

serted W. W. Adams, supervising statistician, U. S. Bureau of Mines. These fatal accidents are rated as causing a loss of 4,000,000 man-days and the non-fatal injuries a loss of about 1,000,000 man-days, a total of 5,000,000 man-days, the equivalent of the time of 17,000 men for 300 days. Roof falls in coal mines cause about 625 deaths and 15,000 injuries yearly, of which 500 fatalities and 12,000 injuries are in bituminous mines and about 100 fatalities and 3,000 injuries in the Pennsylvania anthracite mines. Metal mines have between 50 and 75 deaths and about 2,200 injuries annually from this cause. Iron-ore mining has the lowest accident-frequency rates of any, less than a half and sometimes only a third as high as the corresponding rates for some of the other major classes of mines.

Little Is Known About Bumps—Bumps so severe that 14 of them were recorded seismologically at Ottawa and 580 at Boston have occurred in the mines of the Lake Shore Mines, Ltd., Kirkland Lake, Ontario, Canada, asserted Dr. E. A. Hodgson, seismologist, Dominion Department of Mines and Resources, speaking at the session of Oct. 6. So far, prognostication had not been possible. About all that could be asserted was that if no seismic manifestation occurred between 4 and 6 p.m. on one day, no danger apparently was to be apprehended if the men went into the mine at 7 a.m. the next day.

Bumps Begin at 1,000-Ft. Cover—Coal bumps usually occur where the cover exceeds 1,000 ft. and where coal, roof and floor are hard, and in an area bounded on all or at least three sides by worked-out areas, said R. D. Currie, district engineer, General Reinsurance Corp., speaking for E. R. Maize, senior coal-mine inspector, U. S. Bureau of Mines. Bumps may be either of the pressure or shock type. Which of these is the more frequent is debatable. When a pressure bump occurs, overloads burst the pillars and some of the seam and often some of the floor also is projected into the opening. With a shock bump, the pillar or the more or less solid coal receives a sudden and severe blow. Where the roof coal or floor are soft or a thin layer of soft material occurs in either, a squeeze rather than a bump may occur. Silence in a bump area is regarded as an indication that a bump is likely soon.

Bumps as Variant as Their Causes—One cannot generalize either as to the character or causes of bumps, declared Dan Harrington, chief, Health and Safety Service, U. S. Bureau of Mines. In the Sunnyside (Utah) bumps, the coal was mostly dust and nowhere bigger than one's fist. The trouble occurred in a fault block, and the stress seemed related to geologic stress, but in some places bumps are due to bad mining practice, as were those at Castlegate No. 1. Here, the partly caved area had to be entered despite the cost, using extensive cribbing. The pillars that had been left were shattered by shots, but this was done by shots fired from the surface when *all* men were out of the mine. The bumping then ceased.

A pillar, 40x60-ft., protruding beyond the pillar line, in Kentucky, was believed to be the cause of a burst, asserted A. D. Sisk, safety director, Big Sandy-Elkhorn Coal Association. After this was shot out, the trouble ceased. Some coal men declare that pillar lines should not be straight but concave, as thereby weight would be better distributed.

Do Employees' Magazines Promote Safety?—"Modern mine safety was born of publicity and by publicity is it nourished," said H. H. Null, mine foreman, Olyphant colliery, Hudson Coal Co., quoting the *Mining Herald*, published over 50 years ago. He declared that the readers of *The Safety Commentator*, which he publishes for the company's employees, signified in a questionnaire their preference for the safety items in the publication over all other features, 14 putting them in first place, 10 in second place and only 2 in seventh and last place. It is mailed to all employees who ask for it and about half do so. A monthly publication, established in 1937, it costs the company 11c. a copy including postage, accepts no advertising and has a circulation of 2,500 copies. The safety record of the company has improved since it made its appearance.

Instances Eight Other Publications—Other such periodicals are *M-S-A News*, Pittsburgh, Pa., Mine Safety Appliances Co. (first published 1919); *Employees' Magazine*, Rock Springs, Wyo., Union Pacific Coal Co. (1924); *Safetygram*, Pekin, Ill., Bell & Zoller Coal & Mining Co. (1930); *The Coal Miner*, Pratt City, Ala., Tennessee Coal, Iron & R.R. Co. (1938); *P.C.C. News*, Pittsburgh, Pa., Pittsburgh Coal Co. (1940); *Bread and Butter Bulletin*, Shenandoah, Pa., Locust Coal Co. (1940); *Safety Bulletin*, Allock, Ky., Carrs Fork Coal Co. (1940); and *Red Robin*, Bluefield, W. Va., Eastern Coal Sales Co. (1942).

All are monthlies except the last, which is semi-monthly; the *M-S-A News*, which is weekly, and the *Bread and Butter Bulletin*, which is bi-weekly. The largest circulation is 4,000 copies and the smallest 400. The most expensive is the Union Pacific Coal Co. publication, which costs the company 15c. net.

Value and nature of safety incentives were presented in an address by R. R. Knill, safety engineer, Union Pacific Coal Co., and of community safety meetings by W. D. Northover, safety engineer, Rochester & Pittsburgh Coal Co., Indiana, Pa.

By unanimous vote, all the officials for the past year were reelected. It is questionable how long and how actively they will serve, for a separation between the coal and non-coal men is anticiapted. In the morning of Oct. 6, a meeting of coal-mining members was held and, in the afternoon, at a separate meeting, at which no action was taken, the metal men showed by typical statements that, while at first they disapproved of the divorce between coal and non-coal interests, they were finally convinced it was the best for all concerned.

The Union's Safety Stand—The recommendations of the United Mine Workers for the promotion of mine safety was a feature of a statement by Dr. Walter N. Polakov, representing the union and a new member of the committee, to the Committee on Conservation of Manpower. These recommendations were:

A. Establish uniform mine-safety standards in all coal-producing States, accepting the rules set by the U. S. Bureau of Mines.

B. Write into the Federal Mine Inspection Act a definite provision concerning non-compliance with the recommendation of the Federal Mine Inspectors' reports, and granting the U. S. Bureau of Mines the right to enforce the recommended improvement within a reasonable time.

C. Full participation in all mine inspections, whether by State or federal authorities, by duly established mine safety committees and/or accredited representatives of the United Mine Workers of America.

Therefore, in order to secure these preliminary and partly effective safety measures, this committee should:

1. Organize first State committees consisting of State and federal mine inspectors, delegates of mine workers and of the representatives of the operators' associations from each district.

2. These State committees should collect all pertinent informations, complaints and recommendations by contacting and consulting all mine safety committees in the territory of their jurisdiction.

3. All this material to be turned over to the national committee for careful study and such action as the individual cases may warrant.

4. The copies of the data to be referred

ANNUAL AVERAGE COAL-MINE FATALITIES

Period Averaged (Both Years Included)	Fatalities From Falls of Roof and Coal	Percent of Total Fatalities Due to Roof Falls	Fatalities From All Causes	Production per Fatality Tons
Bituminous Coal Mines				
1933–37.....	550	54.40	1,011	385,536
1938–42.....	538	51.00	1,055	435,443
Pennsylvania Anthracite Mines				
1933–37.....	130	52.85	246	215,763
1938–42.....	117	56.25	208	251,361
All Coal Mines in United States				
1933–37.....	680	54.10	1,257	352,311
1938–42.....	655	51.86	1,263	405,472
Philadelphia & Reading Coal & Iron Co. Mines				
1933–37.....	8.4	31.00	27	255,504
1938–42.....	4.6	37.00	12.5	484,136

Figures for 1942 are estimated figures. Production in the years 1933–1937 in the Philadelphia & Reading mines averaged 7,000,000 tons and in 1938–42 averaged 6,000,000 tons.

to the U. S. Bureau of Mines and to the National Safety Council for such use and action as they can properly take.

5. State committees should organize rallies, lectures, demonstrations and classes in all local unions, using as a textbook the "Miners' Safety Manual" prepared by the U. S. Bureau of Mines.

6. Give wide publicity to the work of the State and national committees through the press and radio, especially stressing the cases of neglect in any instance to provide safety measures by individual corporations.

7. National and State committees should organize legislative service, seeing to it that the aims A and B are incorporated in the State and federal statutes.

8. The national committee, in cooperation with the National Safety Council, should immediately establish a technical subcommittee to design safe types of mining equipment and submit them from time to time to the U. S. Bureau of Mines for criticism and approval.

•

Elkhorn Junior Mine Now Producing

Elkhorn Junior Coal Co. was to ship the first coal from its new mining operation at Thornton, near Bastin, Ky., during the second week in October, according to Foreman Howard Adams, although work had not been completed on the tipple. The plant is designed for an eventual production of 2,000 tons of coal a day.

The new mine, completely mechanized, will employ about 200 workers when running at capacity. This plant replaces the company's worked-out operation at Millstone, Ky. F. W. Slemp is head of the company.

•

Work About to Start On Tennessee Gas Line

Construction is to be started immediately on the Tennessee Gas & Transmission Co. 1,228-mile natural-gas line from Corpus Christi, Texas, to Cornwell Station, W. Va., for which a certificate of convenience and necessity was formally issued Sept. 25 by the Federal Power Commission. According to Gardiner Symonds, vice president of the Chicago Corp., which has acquired a major interest in the Tennessee company, orders for 215,000 tons of steel for the pipe, mostly of 24-in. diameter, have been placed with the National Tube Co. and A. O. Smith Corp., delieveries to begin in December.

In entering its formal opinion—No. 93A—in the Tennessee gas case FPC stated, in part: "Upon the record before us, we entertain no doubt as to the necessity for this project. In Opinion No. 93, we discussed the gas shortage in the Appalachian area and found that a new pipeline was necessary not only in connection with the war effort but for postwar demands. Since the issuance of that opinion the War Production Board has made, and formally advised us of, its definitive finding that a new line must be built to augment the natural-gas supply into the Appalachian area 'as an essential part of the war program' and that such line 'must be completed in time for operation during the winter of 1944-45 in order to prevent interruption in war production that would otherwise occur.' Moreover, that board reached this decision after thorough investigation of the possibility of meeting the fuel shortage by such alternative measures as interconnections, conversion of fuel-consuming equipment and utilization of producer (coal) gas.

"The evidence does not appear to establish clearly the ability of the coal industry under existing conditions to meet the additional fuel needs for war. Moreover, on Sept. 18, 1943, the Solid Fuels Administrator for War announced that 'coal production has been unable to keep pace with the expansion of war requirements' and declared that: 'There is a far better chance that the situation will grow worse before it grows better, because the coal industry faces strict limitations despite any efforts which can be made to raise production levels.'"

The hearing scheduled for Oct. 5 on the application of the Hope Natural Gas Co. for permission to build a 22-in. line from the Hugoton field in Kansas and Oklahoma to West Virginia was postponed indefinitely by FPC. The postponement was suggested by representatives of the Hope company. The War Production Board had promised priorities on materials for only one line from the Kansas-Texas-Oklahoma gas fields to the Appalachian industrial area.

•

Accident Fatality Rate Remains at Low Level

Accidents at coal mines of the United States caused the deaths of 99 bituminous and 22 anthracite miners in August, according to reports furnished the U. S. Bureau of Mines by State mine inspectors.

With a production of 51,700,000 net tons, the accident death rate among bituminous miners in August last was 1.91 per million tons, compared with 2.26 in August, 1942.

The anthracite fatality rate from accidents in August last was 3.91 per million tons, based on an output of 5,624,000 tons, against 2.51 in the eighth month of last year.

For the two industries combined, the accident fatality rate in August last was 2.03, compared with 2.28 in the corresponding month a year earlier.

Fatalities during August last, by causes and states, as well as comparable rates for the first eight months of 1942 and 1943, were as follows:

U. S. COAL-MINE FATALITIES IN AUGUST, 1943, BY CAUSES AND STATES

State	Underground: Falls of Roof	Falls of Face	Haulage	Gas or Dust Explosions	Electricity	Machinery	Other Causes	Total Underground	Shaft	Open-cut	Surface	Grand Total
Alabama	1	..	..	26	1	..	..	28	..	..	3	31
Arkansas	..	..	..	..	1	..	..	1	..	..	..	1
Colorado	1	..	..	..	..	..	1	2	..	..	..	2
Illinois	7	1	3	..	..	..	..	11	..	1	..	12
Indiana	2	..	..	..	..	..	..	2	..	..	1	3
Iowa	2	..	..	..	..	..	..	2	..	..	..	2
Kentucky	5	..	1	..	..	1	..	7	..	..	1	8
Missouri	..	..	1	..	..	..	..	1	..	..	..	1
Montana	1	..	..	..	..	..	..	1	..	..	..	1
Ohio	5	..	1	..	..	..	..	6	..	..	..	6
Penna. (bit.)	4	..	5	..	..	1	..	10	..	1	..	11
Virginia	..	..	..	..	..	..	2	2	..	..	..	2
Washington	..	..	..	..	1	..	..	1	..	..	..	1
West Virginia	10	..	3	..	..	..	..	13	..	..	4	17
Wyoming	..	..	1	..	..	..	..	1	..	..	..	1
Total bituminous	38	1	15	26	3	2	3	88	..	2	9	99
Pennsylvania (anthracite)	12	..	5	..	..	..	..	17	1	..	4	22
Grand total	50	1	20	26	3	2	3	105	1	2	13	121

DEATHS AND FATALITY RATES AT U. S. COAL MINES, BY CAUSES OF ACCIDENTS*

January-August, 1942 and 1943

Cause	Bituminous: Number Killed 1942	1943	Killed per Million Tons 1942	1943	Anthracite: Number Killed 1942	1943	Killed per Million Tons 1942	1943	Total: Number Killed 1942	1943	Killed per Million Tons 1942	1943
Underground:												
Falls of roof and coal	411	416	1.078	1.069	96	71	2.398	1.755	507	487	1.204	1.134
Haulage	151	146	.396	.375	23	24	.574	.593	174	170	.413	.396
Gas or dust explosions:												
Local	6	19	.016	.049	5	1	.125	.025	11	20	.026	.046
Major	121	122	.317	.314	...	...	....	....	121	122	.287	.284
Explosives	13	18	.034	.046	9	6	.225	.148	22	24	.052	.056
Electricity	38	24	.100	.062	5	...	.125	....	43	24	.102	.056
Machinery	30	15	.079	.039	1	1	.025	.025	31	16	.074	.037
Shaft	3	6	.008	.015	2	1	.050	.025	5	7	.012	.016
Miscellaneous	24	24	.063	.062	9	9	.225	.222	33	33	.078	.077
Stripping or open-cut	16	17	.042	.044	2	7	.050	.173	18	24	.043	.056
Surface	37	45	.087	.116	8	15	.200	.371	45	60	.107	.140
Grand total	850	852	2.230	2.190	160	135	3.997	3.337	1010	987	2.398	2.298

* All figures subject to revision.

Underwood & Underwood

Harry C. Chellson

Harry Chellson Back With McGraw-Hill

Harry C. Chellson, formerly associate editor of *Engineering and Mining Journal* and more recently editor of *Mining Congress Journal*, has rejoined the McGraw-Hill Publishing Co. as manager of research for *E. & M. J.* and *Coal Age*. After graduation from the New Mexico School of Mines in 1923 Mr. Chellson spent several years in engineering work in Arizona and at a number of Mexican mines and later was engaged for two years in examining copper, lead and zinc deposits in Asia for the Mining Trust of U.S.S.R. He also was consulting geologist to the Soviet Gold Mining Trust in Siberia and vice president of the Prommel Mining Co., of Denver, Colo., before joining the editorial staff of *E. & M. J.*

•

Oil Pipeline Projects Far Advanced

Petroleum Administrator for War Harold L. Ickes announced Oct. 10 that movement of oil to the Atlantic Seaboard by pipeline had reached the record-smashing figure of more than 360,000 bbl. per day. Two years ago—in July, 1941—the pipeline flow of oil to the East Coast averaged only 66,000 bbl. daily.

These other significant facts also were disclcosed by Administrator Ickes in a report of progress on the multi-project government-industry program under which total pipeline deliveries into District 1 are scheduled to be stepped up to 700,000 bbl. by spring or early summer:

1. Of 18 major projects authorized, 13 have been completed.

2. Total estimated program cost—$256,000,000, financed as follows: U. S. Government, $187,000,000; private industry, $69,000,000.

3. Total length of new construction authorized—7,257 miles, including 4,553 miles of new pipe and 2,704 miles of second-hand pipe.

4. By the end of August, completed construction totaled 5,721 miles, including 3,243 miles of new pipe and 2,478 of second-hand.

5. Work has been entirely completed on other projects, as a result of which the direction of oil flow through 3,303 miles of existing lines has been reversed.

6. Of a total of 328 miles of natural-gas lines scheduled for conversion to oil service, work has been completed on 253 miles.

7. Total mileage of all new construction, reversal and conversion projects: 10,888. Total completions to end of August: 9,277 miles.

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Blue Diamond Coal Co. Plans New Mine

Development of a new coal mine with a capacity of over 1,000,000 annually on the drainage of Leatherwood Creek in Perry, Leslie and Harlan counties, in eastern Kentucky, is now under way by the Blue Diamond Coal Co., Knoxville, Tenn. Granting of the necessary approvals by the various government agencies concerned to Blue Diamond and the Louisville & Nashville R.R. in recent weeks has made this development possible and bids are being received for construction of the railroad.

Blue Diamond has over 50,000,000 tons of workable coal in the Leatherwood seam under lease from the Kentucky River Coal Corp. on the property which it is developing. The Leatherwood territory is said to be one of the best undeveloped coal territories in the high-volatile coal districts of Kentucky, Tennessee and Virginia.

This development was first planned in 1918, and permission to build the coal branch line was obtained from the Interstate Commerce Commission at that time, but, war ended, the coal was not needed and the project was deferred.

The Kentucky River Coal Corp., Blue Diamond Coal Co. and the Louisville & Nashville R.R. have been working toward the present project since 1918. No additional coal branch lines or coal development in the Leatherwood area will be made for some time, the present development being planned to supply the demand for this coal for several years.

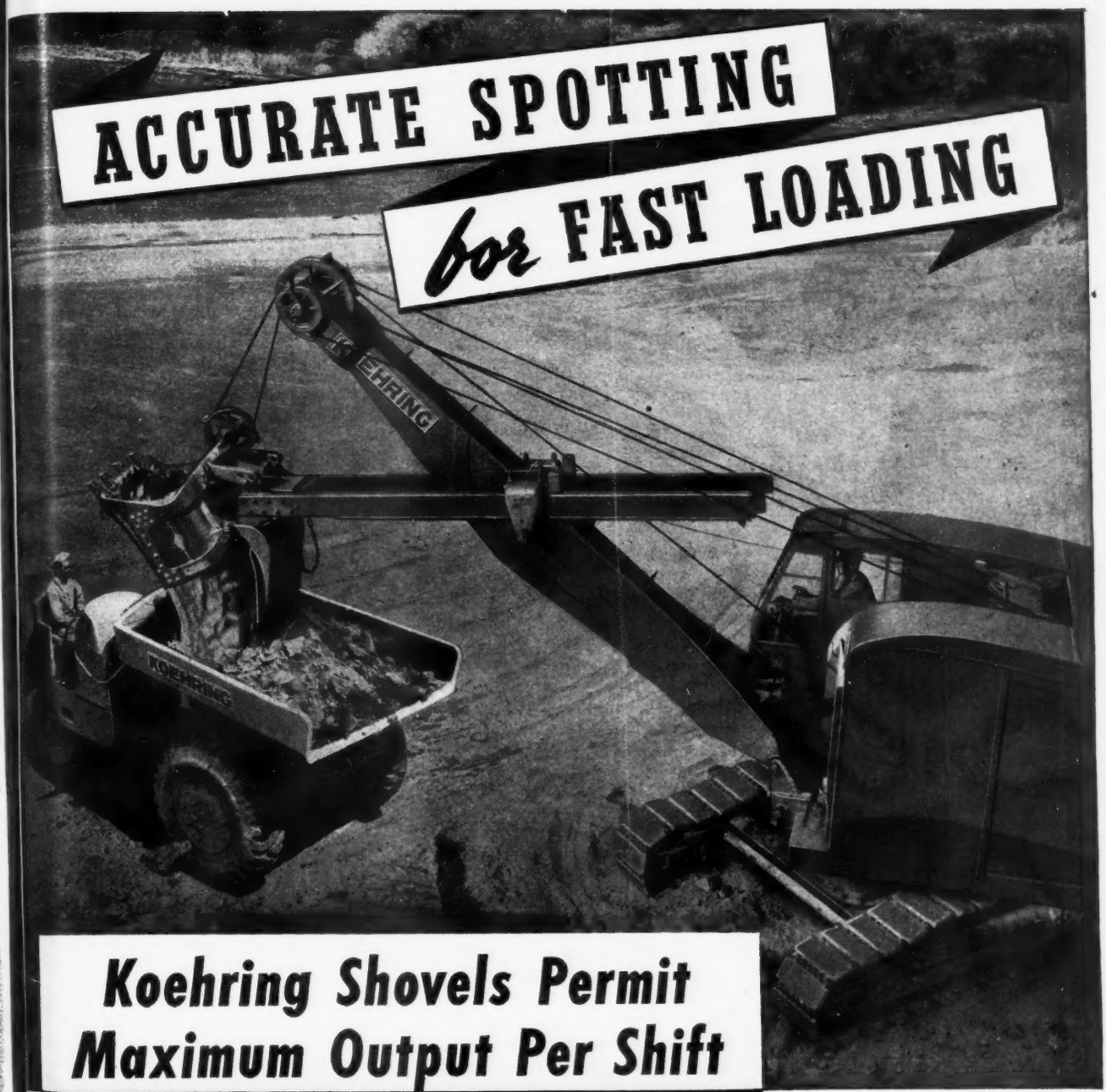
The new project is on the drainage of Leatherwood Creek, a tributary of the North Fork of the Kentucky River. The coal branch line starts at Cornettsville, on the Eastern Kentucky Division of the Louisville & Nashville R.R. The coal property is in Perry, Leslie and Harlan counties, Kentucky, and lies between the well-known Hazard and Harlan coal fields, being about equally distant from the hearts of these two districts.

The main-line railroad features heavy mountain construction and will cost around $200,000 a mile. Blue Diamond plans to spend about $2,500,000 on its mining plant and mine development.

The mining village will be at the head of Clover Fork, off Leatherwood, in Perry County, within 2 miles of where the Perry, Harlan and Leslie counties corner.

"O.K., once more: but hit it for a change."

ACCURATE SPOTTING for FAST LOADING



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Deltabeston Apparatus Cable is composed of a large number of very soft, small copper strands to obtain greater flexibility and withstand vibration. It is insulated with felted asbestos, varnished cambric insert and asbestos braid which resists the action of heat, oil, grease, moisture and corrosive vapors.

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GENERAL ELECTRIC

A.F.L. to Readmit Lewis If Disputes Are Settled

At its convention in Boston, the American Federation of Labor overwhelmingly voted a gesture of welcome to John L. Lewis' United Mine Workers Oct. 13, but made it clear that settlement of jurisdictional conflicts must precede his readmission.

The convention authorized the executive council to negotiate the return of the miners after federation leaders made pleas to delegates to place no obstacles in the path of labor unity.

Matthew Woll, chairman of the resolutions committee, assured the delegates: "This formula is designed to protect the interest of every affiliated organization. This council is not going to bargain away the jurisdictional rights of any organization merely to admit the United Mine Workers."

The convention's action was a rejection of Mr. Lewis' terms that the federation take the U.M.W. "as is" and leave any jurisdictional questions until "after the fact of reaffiliation." The principal issue was the U.M.W.'s catch-all district 50, which has enrolled workers claimed by many A.F.L. craft unions.

•

N. & W. Plans New Line In Pike County, Ky.

Norfolk & Western R.R. has filed application with the Interstate Commerce Commission for permission to construct 9.3 miles of railroad in Pike County, Kentucky, to tap new coal fields, and further asks authority to build 2 miles of additional spur line when necessary. The new connections would tap both coal and timber properties that are now isolated.

The company further requested the Commission to suspend a certificate granted the Levisa River Railroad Co., subsidiary of the Chesapeake & Ohio, issued in November, 1929, authorizing that line to build 28 miles of railroad in the same general area in which Norfolk & Western plans to build, it citing that the Levisa company never started construction.

If this project is allowed, it will be the second important short line into coal fields in this area in recent months, as the I.C.C. recently granted the Louisville & Nashville R.R. a permit for extensions in eastern Kentucky.

•

Test Processing Plant Being Built in Utah

A coal processing test plant is being constructed in Salt Lake City, Utah. When its work has been completed, the Coal Logs Mfg. Co., it is reported, is to erect a plant in Carbon County, Utah, to produce coal logs on a commercial scale. The testing plant, which has a capacity of 50 tons, is being placed in Salt

9 Factors Affecting the Life of Wire Rope (Continued)

(This is number 18 in a series of articles prepared by Macwhyte Wire Rope Company for the benefit of wire rope users everywhere. All articles in this series are yours for the asking. Macwhyte Engineering Experience is available on specific problems.)

★ ★ ★

In the previous article of this series, the first four of nine factors affecting wire rope life or service were discussed. They were:

1. *Abrasion or Wear*
2. *Bending or Flexing*
3. *Tension or Stress*
4. *Speed*

As the article pointed out, these four can be kept from doing too much harm (to rope and machine) by frequent checkups.

While some of the four factors mentioned above are normal and to be expected, there are five other "rope saboteurs" which are *not* normal. These can be corrected. They are:

5. *Crushing or Mashing*
6. *Weathering or Corrosion*
7. *Jerking or Shock*
8. *Vibration*
9. *Heat or Friction*

What can you do to correct them, and thus save steel and time now so urgently needed? Here are specific suggestions.

Not EVERY Enemy is found on the battlefront. Look . . .

Killed through Carelessness. Literally chewed to death, this rope was ruined before showing any normal wear.

Unnecessary Abrasion. A hoist rope was allowed to saw through a heavy plate. Such waste can and should be avoided.

Mashed to Death. Criss-crossed on the drum, this rope gave only a fraction of the service it might have, had more care been used in spooling.

Why Such Waste? This rope has been cutting a number of grooves in the bucket rim. It will give poor service and increase operating costs.

Crushing or Mashing

Improper winding (criss-crossing) on the sheaves or drums results in crushing or mashing. It *pays* to start the rope winding properly. Keep it from criss-crossing and reduce scuffing against the flanges of the drum and against the under layer to a minimum.

Where rope is loose on the ground (on incline slopes especially) it pays to prevent trucks or equipment from running over the rope. Lubricate rollers, sheaves, and guides so as to avoid undue abrasion. When rope jumps a sheave, stop and replace it before continuing the operation.

Permanent injury to the rope and damage to equipment can result if a rope is operated while out of its proper sheaves. In clamping or fastening the end of the rope use care to avoid needless damage.

Weathering or Corrosion

Wire rope is made of high carbon steel wire and will rust and corrode if not properly protected by a suitable lubricant, especially if it is not in constant use. Proper lubrication keeps the rope flexible and reduces wear as well as affording a protection against corrosion. (See article 10 in this series.)

Jerking or Shock

If there is slack in a rope, take it up slowly before the load is applied. This is where the human element enters the picture. Many a rope is ruined for lack of care on the part of the operator. A quick pickup with as little as 12 inches of slack will more than double the load on the rope and may cause it to snap. Even if the rope doesn't break immediately, it is weakened and breaks later in normal operation. (See article 15.)

Vibration

Vibration of wire rope in service fatigues the steel wires and consequently "tires" them out before they wear out. It is difficult to correct this except where this vibration is caused by faulty equipment and hurried handling. A clutch or brake may chatter and this vibration is multiplied many times throughout the length of the rope. Vibration may cause rope to break where it is dead ended (fastened). Where wire rope is fastened in a socket, continuous vibration will cause the wires to break right at the socket—cutting off a short section and refastening is a cure for this. A smooth pickup and steady operation will do much to eliminate vibration.

Heat or Friction

Heat changes the structure of steel. In general, it hardens it or makes it more brittle. Friction creates heat. Lubrication helps reduce friction. A stuck roller, a poorly aligned sheave, scuffing against wraps of rope on a drum, scraping on rock or metal creates friction and heat. Wire rope must be kept free to do its job of bending. Heat and friction will change its steel composition and cause it to break up prematurely. Where ropes travel at high speed, watch out for the effects of heat.

Your Wire Rope Requirements

The benefit of years of experience based upon servicing equipment similar to yours is gladly given. When you ask Macwhyte for suggestions and recommendations, you can be assured not only of getting "The Correct Rope for Your Equipment," but also a personal interest in helping *you* get the most out of *your* rope.

Feel free to consult with Macwhyte distributors, Mill Depots representatives, or write to Macwhyte Company direct.

MONARCH WHYTE STRAND PRE-FORMED WIRE ROPE

. . . Macwhyte's best grade wire rope, famous for its strength, toughness, preforming, and internal lubrication.

NO. 608

MACWHYTE COMPANY

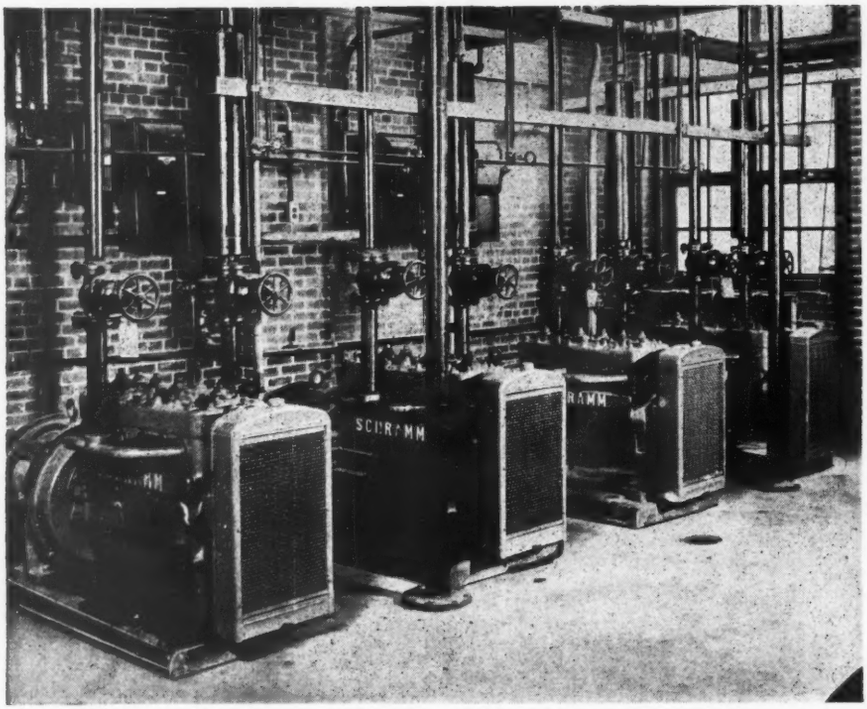
ARMY E NAVY

WIRE ROPE MANUFACTURERS

2931 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York · Pittsburgh · Chicago · Fort Worth · Portland · Seattle · San Francisco. Distributors throughout the U.S.A.

MACWHYTE PREformed and Internally Lubricated Wire Rope
MONARCH WHYTE STRAND Wire Rope
MACWHYTE Special Traction Elevator Rope
MACWHYTE Braided Wire Rope Slings
MACWHYTE Aircraft Cables and Tie-Rods



Lots of Power...

BUT EASY TO HANDLE!

Here's four of a battery of #210 cu. ft. actual air Schramm Compressors, operating as a unit system for a large industrial plant. They're taking care of the variable maximum and minimum load, automatically, 24 hours a day—*with minimum attention!*

Schramm was specified because it provides heavy-duty, continuous operation with least attention, upkeep and operating costs.

Schramm Air Compressors are available with various types belt drives, as well as built-in motor drive and direct connected diesel or gasoline engines. Each unit is lightweight, compact, with capacities up to 600 cu. ft. displacement.

Long-life features of Schramm include: mechanical intake valve... vertical piston travel and horizontal valve action... sturdy support for cylinder head... and forced feed lubrication.

Other Schramm features are likewise outstanding. Write today for complete details in Catalog 42-S.

SCHRAMM INC

THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

Lake City, it was stated, because of the availability of engineers, machine shops and other necessary facilities. The State of Utah has made the arrangements for constructing the test plant.

•

Bituminous Publicity Campaign Under Way

The first volley in the institutional advertising campaign of the Bituminous Coal Institute, New York City (Coal Age, October, p. 138), was fired in mid-October with the appearance of its initial ad. It occupied a full page in the *Saturday Evening Post* of Oct. 16. Headed "Public Energy No. 1," it emphasizes that the bituminous coal industry is well managed; alert to its responsibilities to its employees, to the public and to the government, and points out that bituminous develops more power, pulls more trains, heats more homes, turns more wheels and generates more light than any other fuel and does it at a lower cost.

Besides using the *Post*, the advertising will appear in *Life*, *Newsweek*, *American Home*, *Atlantic Monthly*, *Harpers'* and *Fortune*, also in building trade papers, coal trade papers and coal mining papers.

•

Groups Named On Stream Pollution

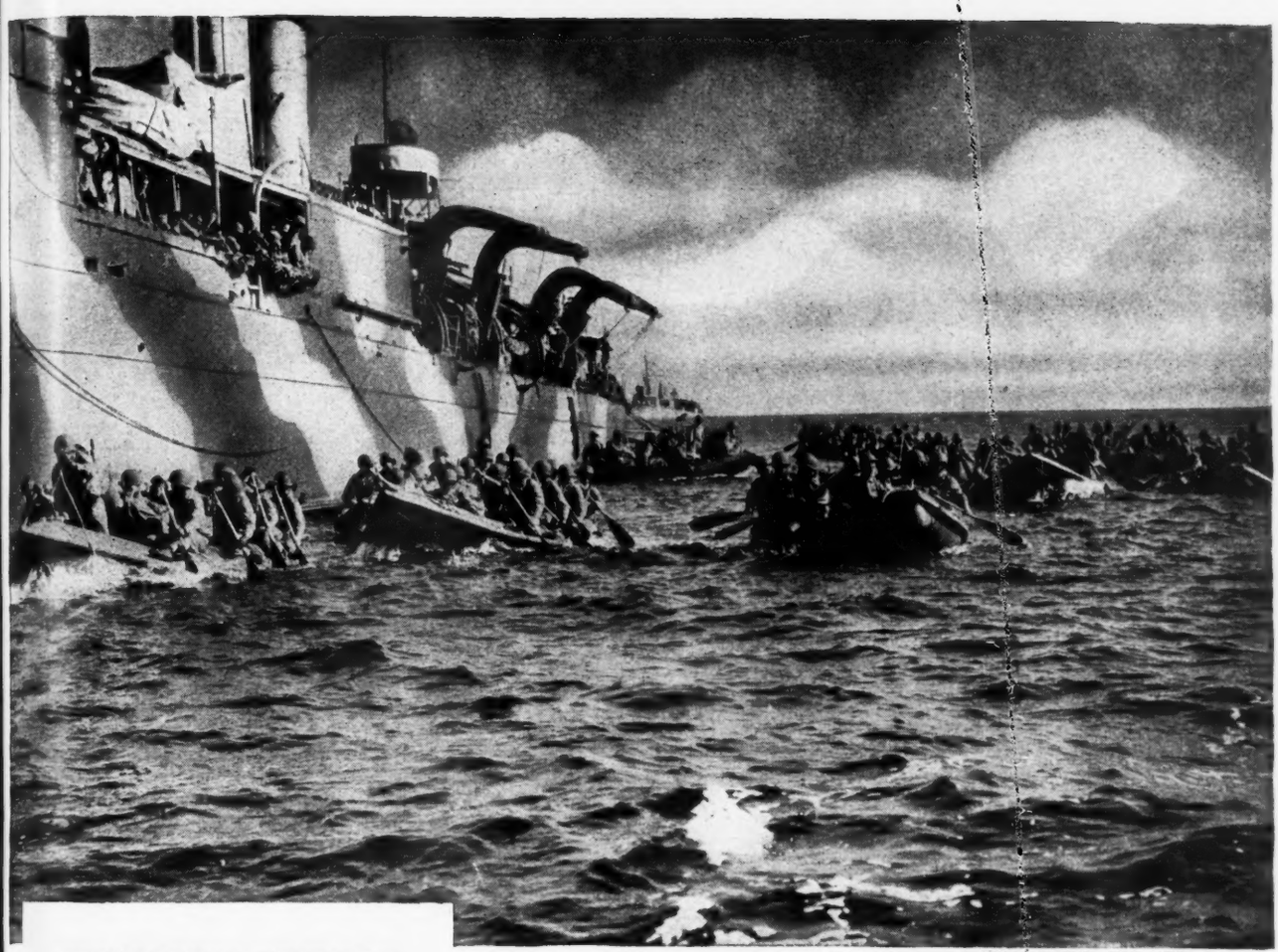
Committees to confer with State Cabinet officers of Pennsylvania on stream pollution have been named by the Anthracite Institute and the Central Pennsylvania Bituminous Coal Producers Association, C. F. Huber, Anthracite Institute president, has appointed the following: J. B. Warriner (chairman), president, Lehigh Navigation Coal Co.; Donald Markle, president, Jeddo-Highland Coal Co.; W. W. Inglis, president, Glen Alden Coal Co.; Louis Pagnotti, president, Pagnotti Coal Interests, Inc.; R. E. Taggart, president, Philadelphia & Reading Coal & Iron Co., and R. L. Birtley, president, Hammond Coal Co.

Named by the central Pennsylvania bituminous producers are: Andrew B. Crichton, president, Johnstown Coal & Coke Co.; A. J. Musser, vice president, Clearfield Bituminous Coal Corp., and Charles O'Neill, president of the association.

•

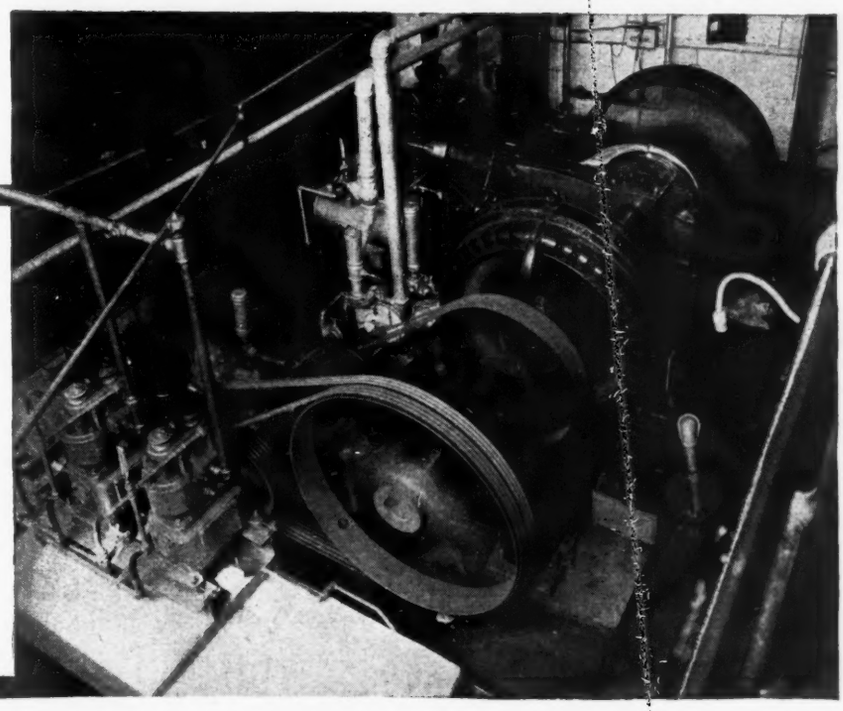
Obituary

C. H. Bower, 57, general superintendent, Meem-Haskins Coal Co., Kodak, Ky., in the Hazard field, died at a Lexington (Ky.) hospital Oct. 5 after a brief illness and an operation which proved unsuccessful. He went to eastern Kentucky about 20 years ago, where he became connected with several of the large operating coal companies, later attaching himself to Meem-Haskins, where he remained until his death. He was a leading stockholder of his company and also had interests in other coal concerns.



Official U. S. Navy Photograph

INVASION ABROAD demands increased efficiency at home. For lubrication that develops full *STEAM* plant horsepower use . . .



. . . SINCLAIR STEAM CYLINDER and VALVE OILS. These oils provide *correct* engine lubrication under all loads and all combinations of operating conditions. They promote low operating and low lubrication costs.

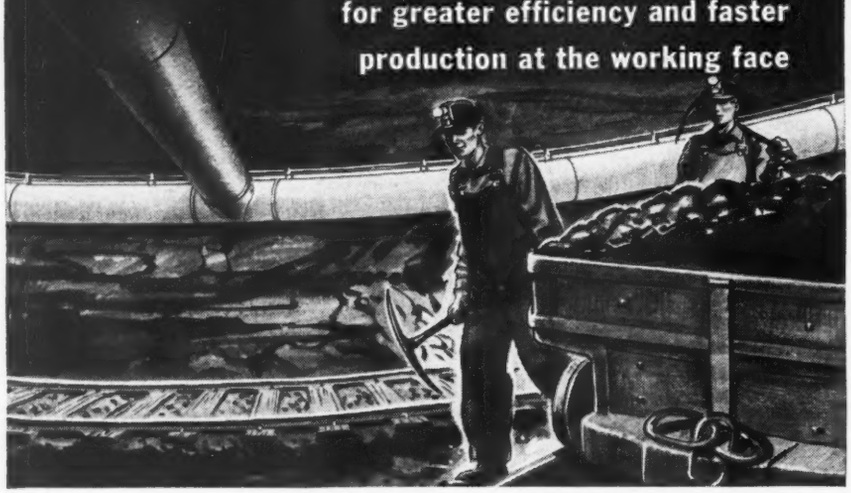
(Write for "The Service Factor"—published periodically and devoted to the solution of lubricating problems.)

SINCLAIR INDUSTRIAL OILS

FOR FULL INFORMATION OR LUBRICATION COUNSEL WRITE SINCLAIR REFINING COMPANY (INC.), 630 FIFTH AVENUE, NEW YORK 20, N. Y.

HOW TO USE DU PONT "VENTUBE"*

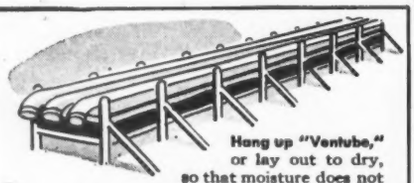
for greater efficiency and faster production at the working face



5 Important Points on Storing "Ventube" Between Jobs

You can make your "Ventube" system last far beyond expectations by checking these points on storing it between jobs . . . to preserve its outstanding strength, pliability and air conductance for long-time service. Write Du Pont for free reprints of previous advertisements in this informative series.

1 Clean "Ventube" with clear water, both outside and inside, avoiding the use of gasoline, naphtha or other cleaning agents harmful to rubber.



2 Hang up "Ventube," or lay out to dry, so that moisture does not remain on the inside of tubing.

3 Lay "Ventube" flat, smoothing out creases and wrinkles.

4 Roll "Ventube" into neat bundles, not too tightly to prevent air from reaching all areas of its surface.

5 Store "Ventube" in a cool, dry place, away from sunlight, heat and chance injury.

Attached to fan of adequate air capacity and with permissible motor, "Ventube" sweeps the face with clean, fresh air. It helps remove dust and bad air from any space a man can enter . . . speeds the coal production cycle . . . promotes health and steady efficiency of workers. "Ventube" is light, compact, easily portable—can be pushed back on itself quickly before blasting. Its sturdy fabric construction, coated and impregnated with a special abrasion-resistant compound, enables "Ventube" to resist heat, moisture, mildew, dry-rot, acid and alkaline waters. If damaged by careless handling, "Ventube" can be patched as easily as an inner tube. E. I. du Pont de Nemours & Co. (Inc.), "Fabrikoid" Division, Fairfield, Connecticut.

*"VENTUBE" is Du Pont's registered trade mark for its flexible, rubberized ventilating duct.

NOTE: For the duration of the War, "Ventube" can be supplied only to the extent that raw materials for its manufacture are made available in accord with regulations issued by the War Production Board. But if you have adequate priority, write now for complete information on this valuable tool of mechanized production.

DU PONT

VENTUBE

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Anthracite Campaign Keynotes Conservation

To enable anthracite consumer to stretch this winter's coal supply, Anthracite Industries, Inc., has instituted an educational program through newspaper and radio advertising and publicity, according to an announcement by Frank W. Earnest, president.

"Of a three-fold nature," said Mr. Earnest, "this campaign serves the consumer, the dealer and the government. It gives the consumer the necessary 'know how' to save at least 10 percent in fuel consumption. It gives immeasurable help to the dealer who is faced with the problem of supplying sufficient coal to the public on staggered quotas and under the hampering difficulties of reduced personnel. It also supplements the government's 'Save and Serve' program sponsored by the War Production Board, Office of Solid Fuels Administration for War and the Office of Defense Transportation."

The first newspaper ad tells consumers "How to Keep Warm With 10 Percent Less Coal." A series of eleven informative steps gives comprehensive advice on how to conserve anthracite and avoid heating trouble by home insulation, proper ways to clean the boiler and furnace, firing attention intervals, draft controls and the daily routine to follow in fair weather or foul.

The ads are appearing in daily newspapers in 66 cities and spot radio announcements are being presented over 22 leading stations throughout the anthracite-consuming area. The campaign opened with a full-page ad and will be followed with additional 672-line ads in approximately the same list of papers. The spot radio announcements urge listeners to ask for information on how to conserve anthracite. They are told to look in their daily paper for the ad running concurrently.

A publicity program keyed to the same theme as the advertising also is being conducted. Informative news releases to newspapers, magazines and radio stations are telling the public how to get the most heat from the least coal. These publicity efforts also are coordinated with government agencies, especially OWI. Special radio material has been prepared for government dissemination. Also, additional material is being furnished to State organizations and local groups for individual State conservation programs.

Complete and detailed information on anthracite conservation practices is given in "How to Conserve Anthracite and Improve Your Heating," a folder offered to consumers free of charge.

•

Soupbone Resumes

While the tipple and loading chute are hardly complete at the reopened Soupbone mine, in the Denning coal field of Arkansas, mining was resumed late in September. The mine was flooded about ten years ago and had been idle since. When equipment is complete about 200 miners will be at work.

You can

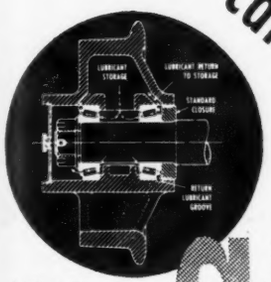


FIG. 1

save money

with Hockensmith "Oilspok" Wheels

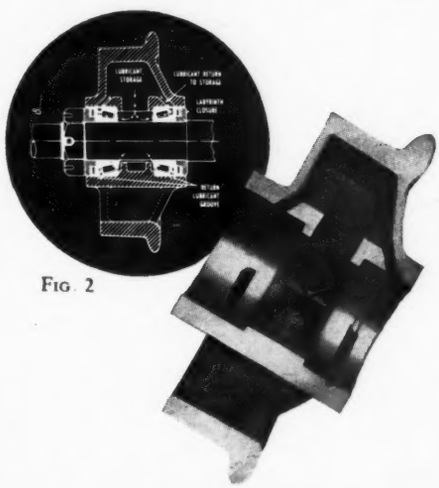


FIG. 2

OIL IS AMMUNITION, USE IT WISELY

The heart of the "Oilspok" principle of lubrication is illustrated in Figure 2. Each hollow spoke or reservoir has three ports leading into the hub—one large central port and two narrow rectangular ports, located at the outside of each bearing. The diamond-shaped spreader, cast integrally with the hub, forces the excess lubricant clinging to the axle into the bearings, from which it is thrown by centrifugal force back again to the storage spokes or reservoirs. The movement of the lubricant in its complete circuit can be readily traced in either Figure 1 or Figure 2. Cash in on the money-saving advantage of "Oilspok" Wheels. Write for full information.

"OILSPOK" WHEELS WILL

1. *Increase Wheel Life.* Excessive tread wear—caused by the churning resistance of heavy greases—is eliminated. Free wheel rotation.

2. *Save Power.* Free wheel rotation means no power lost by churning grease. The lubricant in the "Oilspok" wheel is fluid and free flowing.

3. *Save Lubricant and Lubricating Labor.* "Oilspok" lubrication is positive and continuous—no loss due to bearing pumping pressure or air expansion. One greasing lasts several years—less labor cost and loss of car service.

4. *Give Longer Bearing Life.* Bearing lubricant is constantly changed—bearings clean and cool—constant circulation maintains lubricant in better condition.

5. *Increase Axle Box Life.* "Oilspok" wheels are free turning under all temperature conditions—no chance of axles turning in dry boxes.

6. *Eliminate Disadvantage of Small Diameter Wheels.* Higher hub resistance—a characteristic of small diameter wheels with large bearings—is substantially reduced in "Oilspok" wheels with their positive, circulating fluid lubrication.

7. *Provide Stronger Wheel—No Extra Weight.* "Oilspok" wheels have tapered box-section spokes—the strongest possible construction for resisting side thrust and vertical loads. Same weight as standard wheels for various bearing and axle sizes.

CONSTRUCTION FEATURES

CORRECT DESIGN. Hockensmith "Oilspok" wheels are designed with correct proportioning of the tread, hub, and spokes for maximum strength with an ample margin of safety. "Oilspok" wheels are made for plain or roller bearings.

CAREFUL METALLURGY. Cast from a special alloy to insure deep chilling, strength, and toughness.

SKILLED MOULDING. Cast in machined chills, producing a *round* wheel and *smooth* tread—little brake skidding or rolling friction on the rail.

CONTROLLED ANNEALING. Internal strains are eliminated by carefully controlled annealing in soaking pits located in the foundry floors so wheels reach them immediately after the iron has solidified.

PRECISION MACHINING. Specially designed machines insure tread being concentric with the bore, and hubs being machined to exact limits—important steps in the manufacture of a *good* wheel.

Hockensmith
Wheel & Mine Car Company
Established 1877
PENN, PA.
Long Distance Phone, Jeannette 700

Stearns

Spout

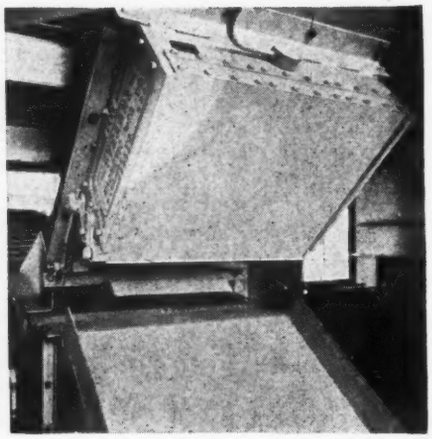
MAGNETS

PROTECT

against

TRAMP

IRON



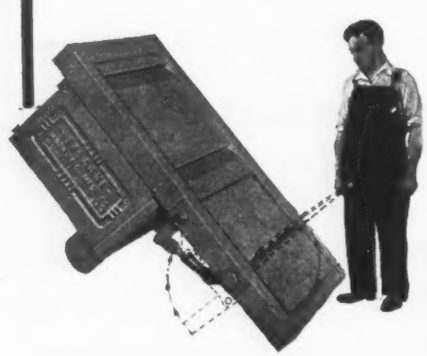
A typical Stearns Spout Magnet installation and the resulting accumulation of tramp iron from several days' operation. And—the scrap metal recovered helps substantially toward paying for the magnetic equipment.

In this age of mechanization, tramp iron and metallic junk in your coal flow can be efficiently, automatically and economically removed with Stearns Magnetic equipment.

Our many years of pioneering experience in designing magnetic equipment for the coal industry enables us to be of profitable assistance in controlling your tramp iron problem.

Cost is negligible compared with the definite results obtained. It will pay you to investigate Stearns Magnetic methods. Let us show you how Stearns magnets can be put to work for you.

Write for Bulletin 97 on Stearns Spout Magnets; Bulletin 302, Stearns Magnetic Pulleys; Bulletin 25, Suspended Magnets.



Stearns Engineers are well qualified to advise you.

Ask for our recommendations. No obligations.

STEARNS MAGNETIC MANUFACTURING CO.

661 S. 28th St., Milwaukee, Wis.

EQUIPMENT APPROVALS

Two approvals of permissible equipment were issued by the U. S. Bureau of Mines in September, as follows:

Goodman Mfg. Co.—Type G and GS-20 shaker conveyors; 20-hp. motor, 220 and 440 volts, a.c.; Approvals 488 and 488A; Sept. 20.

Thomas A. Edison, Inc.—Model K and P single-shot blasting units (Edison Model K and P cap lamps with blasting attachment); Approvals 1224K and 1224P; Sept. 22.

Association Activities

BIG SANDY-ELKHORN COAL OPERATORS' ASSOCIATION reelected Harry LaViers president for a second term at its annual meeting, Oct. 8, at Ashland, Ky. Mr. LaViers is president of the Princess Elkhorn Coal Co., David, Ky., and vice president of the South-East Coal Co., Seco, Ky. B. F. Reed, secretary-treasurer, Turner-Elkhorn Mining Co., Drift, Ky., was named vice president, succeeding L. C. Campbell, of Pittsburgh; and M. H. Forester, Jenkins, Ky., vice president, Consolidation Coal Co., was named treasurer. Mr. Forester succeeds H. Y. Kuhling, of Cincinnati. Directors named, besides the foregoing, include: J. E. Bowman, Utilities Elkhorn Coal Co.; L. C. Campbell, Koppers Coal Division; H. K. English, Clear Branch Mining Co.; Harry B. Crane, Elk Horn Coal Corp.; W. L. Doolittle, Consolidation Coal Co.; J. R. Hurt, Sandy Valley Coal Co.; A. H. Mandt, Stephens Elkhorn Fuel Corp.; K. S. McKinney, James Hatcher Land Co.; E. R. Price, Inland Steel Co.; W. F. Pioch, North-East Coal Co.; C. D. Reed, Turner Elkhorn Mining Cos.; Alan J. Smith, South-East Coal Co.; W. W. Goldsmith, Elk Horn Coal Corp. H. S. Homan, Ashland, Ky., continues as secretary.

NEW RIVER COAL OPERATORS' ASSOCIATION reelected Gilbert Smith as president and S. C. Higgins as secretary at its annual meeting, Oct. 7 at Mt. Hope, W. Va.

KANAWHA COAL OPERATORS' ASSOCIATION reelected L. Newton Thomas as president at its 39th annual meeting. Other officers named are: A. S. Wilson, vice president; William W. Miller, vice president; D. C. Kennedy, executive secretary; Harry G. Kennedy, acting secretary, and John L. Dickinson, treasurer.

•

UMW Wins at Dawson

In an election held at Dawson Collieries, Dawson, near Madisonville, in the western Kentucky coal field, the United Mine Workers was named bargaining agent for the workers, who previously had been under the Progressive Miners' Union, which recently announced it was abandoning the field.

It is reported that the only mine left

POWERFUL PORTABLE PUMPS

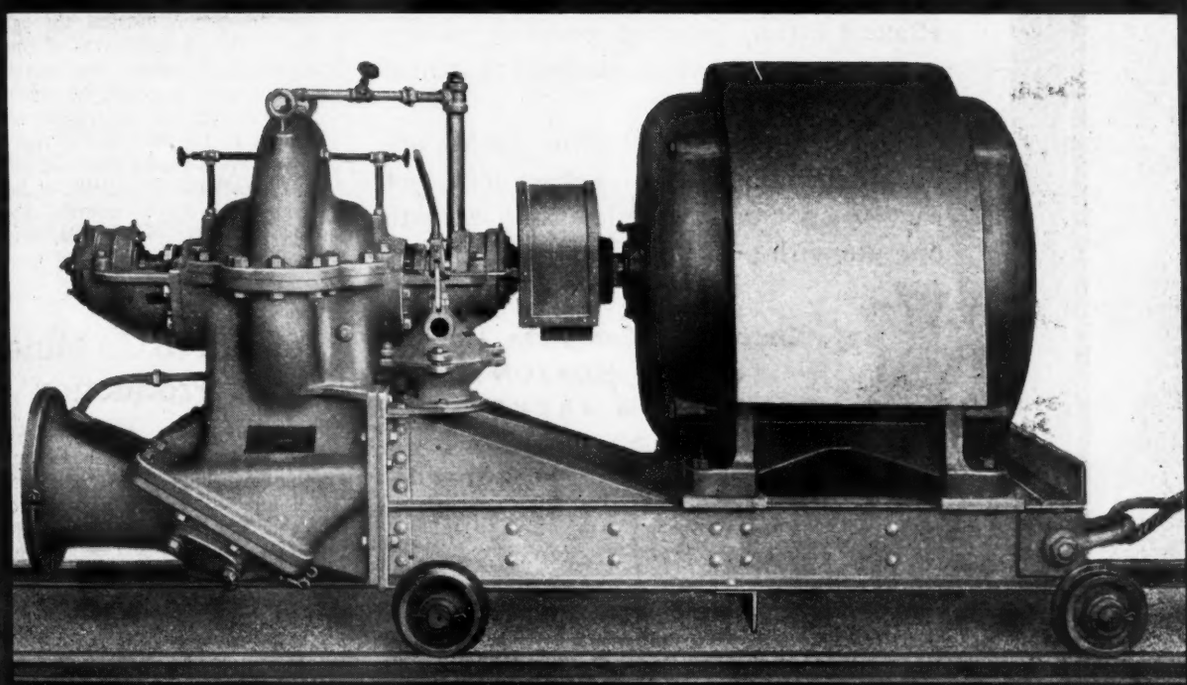
100 to 800 H. P.

For EMERGENCY PUMPING

Are you in a hurry to dewater your mine? Here's just the pump to meet that emergency—a Barrett, Haentjens Sinking Pump which gives you great flexibility in power . . . 100—800 H.P.

These pumps have built-in strainer and work without noise or vibration on heads from zero to maximum—in horizontal, inclined or vertical position.

Other advantages: they require no foundation—remain in alignment under all conditions. For detailed data write for Bulletin No. 14.



BARRETT, HAENTJENS & CO.

Manufacturers of Drainage Equipment for—

THE MINING INDUSTRY

Main Office and Works—Hazleton, Penna.

DUFF-NORTON
MINING JACKS
√ HUSKY
√ EASY OPERATING
√ SAFE
From working face to tipple, count on Duff-Norton Jacks to provide dependable, efficient lifting, lowering, pushing, pulling —they're "mechanical muscles" that help keep production rolling.
You'll find Duff-Norton Jacks are husky enough for the toughest jobs, yet easy to spot under the load and easy to operate with positive safety.
Check the Complete Line of DUFF-NORTON MINING JACKS
The wide line of Duff-Norton Jacks means there's a Duff-Norton for every job! Catalog 201 gives the complete story. Write for your copy today!
THE DUFF-NORTON MANUFACTURING CO.
PITTSBURGH · PENNSYLVANIA
Canadian Plant:
COATICOOK, QUEBEC
Representatives in Principal Cities

in the State under the Progressive banner is the Benham, a captive operation in eastern Kentucky, of the International Harvester Co., which recently voted 366 to 275, to stay with Progressive, in the third election engineered by U.M.W. in its efforts to invade Benham.

•

Conservation Group Formed in Illinois

A State organization has been formed in Illinois at the request of the National Committee for the Conservation of Manpower in Coal Mining. Organized to carry "safety first" and other matters causing loss of time in the coal mines through accidents and other causes direct to the men at the face as well as to the management, the Illinois committee includes the following: Chairman, Robert M. Medill, director, State Department of Mines and Minerals; Richard T. McAllister, United Mine Workers; Joseph Poole, Progressive Mine Workers; Walter Gill, Illinois Coal Producers' Association; John Lyons, Illinois Coal Operators' Association; Ernest J. Simon, Illinois Department of Public Instruction; B. E. Schonthal, Illinois Mining Institute, and Charles Herbert Sr., U. S. Bureau of Mines.

In the belief that results by the program will best be attained by carrying the plan direct to the employers and employees at each mine, meetings are to be held at frequent periods in the various mine inspection districts throughout the State. Before any series of meetings is scheduled, however, the committee is attempting to acquaint the officers of the mine workers and management of the mines with the plan, and to that end asks suggestions to make the plan effective.

The national committee is headed by Thomas Moses, Pittsburgh, Pa., chairman, and R. L. Nicholas, Library, Pa., is secretary.

•

Telkoal (B.C.) Mine Starts Production

Expecting eventually to add 600 to 750 tons daily to the British Columbia coal supply if drilling surveys warrant, the Telkoal mine at Telkwa is producing 25 to 30 tons a day. Output is being increased as the crew is enlarged. Operation of the new plant started Aug. 15. The drilling program is being carried on with two drills working double shifts, by the Emergency Coal Production Board, which will place a third drill in operation soon.

With Vancouver and California directors, the Telkoal Co. took over a field which had been in small production 6 miles south of Telkwa on the Canadian Pacific Ry. about 235 miles east of Prince Rupert. Three square miles was acquired from English owners and 8 square miles under license from the British Columbia Government. The company was formed last January with A. M. Richmond, Vancouver, as president and managing director; W. Reid Ferguson, Los Angeles, vice

Enlarged reproduction free on request

Thanks To The Coal Industry

When certain pirates started picking off what they wanted in China, Africa, Europe and the Pacific—before coming at *us*—they figured that the U.S.A. couldn't do much about it. We didn't have enough ships to handle even 30% of our *peacetime* ocean traffic! How could *we* interfere!

But in twenty months, thanks to your help, America has broken all shipbuilding records. Fighting production workers in mines, mills, forests . . . in factories producing essential parts . . . in oil fields . . . and shipyards . . . have combined to accomplish the "impossible."

Continued success now depends on *maintaining* record-breaking production. The results are *beginning* to interfere with Adolph-Tojo plans. But America must not slacken its pace in producing the materials that go into the building and the operating of our Merchant Marine—the metals, timber, coal and oil, the marine equipment, and cargo for the ships.

Now it is up to all Americans to *finish* the job . . . and *fast*.

You Have Helped Us Do Our Part

We thank you, loyal customer, for conserving Wickwire Rope so that more can go to the Liberty Ships. But when you *need* new wire rope to maintain war production, tough, long-lived Wickwire Rope will always be available on priority, to the best of our ability.

• • •

Wickwire Spencer was first in New England to be awarded the Maritime M and Victory Fleet Flags for excellence in production of rigging for the U. S. Merchant Marine. A Gold Star has been added for maintaining that record.

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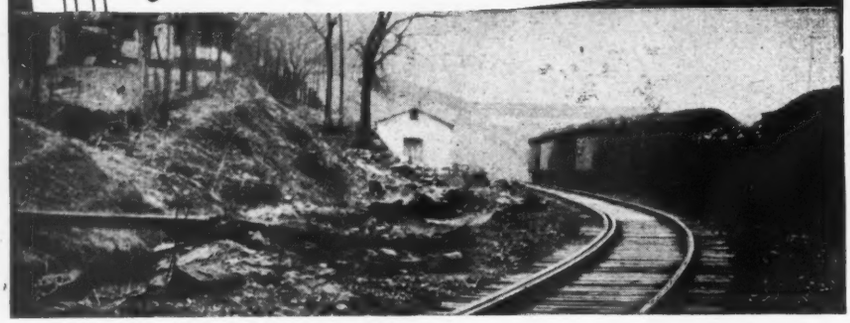
WISSCO PRODUCTS

Clear the Track

FOR LONGER TIE LIFE
AT LOWER COST



HERE'S HOW

Osmose-treated ties cut replacement costs . . . help prevent accidents

Because untreated ties previously decayed within a few years, causing frequent costly replacements, a prominent mining company* installed Osmose-treated ties. *Careful records proved that the Osmose-treated ties lasted 3 to 5 times longer than the untreated ties!*

Thus rail spreading, with resultant accidents, was minimized because of sounder wood structure around the rail spikes.

This explains why so many other mining companies use Osmose-treated ties and timbers *exclusively.*

Our field engineers will gladly asssit you in solving your wood-preserving problems. Write for Bulletin 142-C, *today!*

* Name on request.

Why OSMOSE PROTECTION PAYS

1. APPLICABLE to fresh cut native timber locally obtained and treated thus eliminating or reducing transportation costs to minimum.

2. PENETRATES deeply into the timber providing 3 to 5 times longer service life over untreated wood.

3. ECONOMICAL. No capital investment in treating equipment required. Eliminates costly transportation to and from mechanical pressure-treating plants.

4. EASY TO APPLY by brushing or dipping with unskilled labor. No special expensive equipment necessary.

OSMOSE
WOOD PRESERVING COMPANY
OF AMERICA INCORPORATED
General Offices: Buffalo, N. Y.—Branch Offices: Birmingham, Ala.; Denver, Colo.; Harlan, Ky.; Kenova, W. Va.

president, and R. Rowe Holland secretary. Mine overman is John Gilham, formerly with the W. R. Wilson interests.

Twelve steam-coal seams are indicated, of which three or four are readily mined. They are 8, 17 and 10 ft. in thickness, averaging 6 to 8 percent ash, 67 to 69 percent fixed carbon and between 14,000 and 14,300 B.t.u. per pound, according to reports. The top 3 ft. of the 17-ft. seam, called the Betty, is being developed for blacksmith coal, averaging 2 percent ash. Markets in the Northwest, Alaska and along the Canadian National Ry. are indicated, while blacksmith coal is in demand throughout the province.

•

Company Formed to Deal in Coal Tracts

Allegheny Exploration Co. has been formed, with offices in Pittsburgh, Pa., to engage in the business of purchasing and leasing coal acreages suitable for mining by the open-cut method. The company has a large quantity of excavating and dirt-moving equipment available for setting up coal-mining operations. It also has some properties in western Pennsylvania and West Virginia that will be producing coal in the near future.

The company is operated by John E. Organ and Melvin B. Hott. Mr. Organ is a geologist and a former technical adviser to the Mining Division of the War Production Board. Mr. Hott has been operating mines in Ohio and is president of the Hott Coal Co. and the Hott Coal Corp. Boyd J. Huff, an attorney, who has been connected with the Morgan Coal Co., Indianapolis, Ind., for the last seven years, also is associated with the new organization in charge of leasing and property acquisition.

•

Dismal Fuel Outlook Confronts Canada

Curtailed supplies and manpower give Canada a dismal fuel outlook for this winter, a survey in the second week of October showed. The shortage of coal is most acute in the eastern provinces but all across the country dealers and householders are plagued by a shortage of men to deliver what coal now is on hand.

There was some improvement in Canada's coal supply during August although not enough to make conditions any less critical as the result of a sharp increase in imports from the United States from 2,909,743 tons to 3,801,718 tons, while production was only slightly down at 1,426,032 tons as compared with 1,468,448 tons a year ago. The result was that while the apparent supply for the first seven months of the year of 22,707,858 tons was 2 percent below the supply of 23,150,386 tons in the same period of 1942, the cumulative supply for the first eight months of 27,812,829 tons was 386,358 tons, or 1.4 percent, greater than

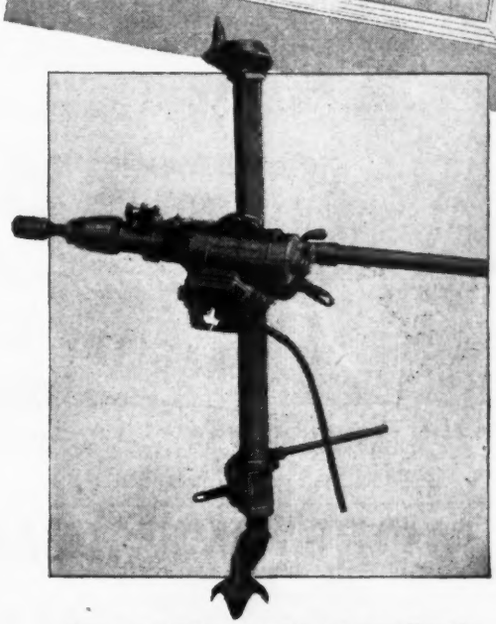
First Aid

. . . TO FASTER, LOWER COST DRILLING

Just off the press . . . a new CP publication . . . describing in detail and illustrating all the motors, drill mountings, clutches, posts, boots, boxings, thread bars, auger and cutter heads in the world's most complete line of electric coal drilling equipment.

From the various components illustrated in this new catalog the operator can readily select the best combinaton of motor hook-up, post, etc. to meet specific conditions.

Write today for your copy of Catalog No. 901, "CP Post Mounted Electric Drills."



One of a Number of CP Drill Assemblies: No. 473 D.C. Open Type Motor; No. 1150 Drill Mounting; No. 1170-X Clutch; No. 780-X Post; No. 957 Thread Bar; No. 794 Socket.

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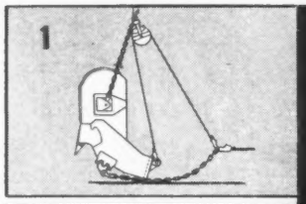

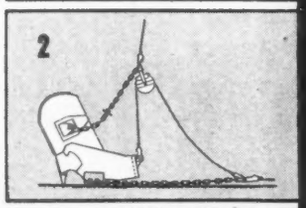

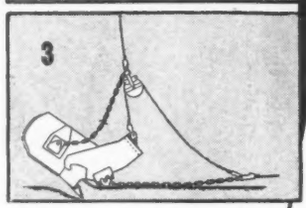

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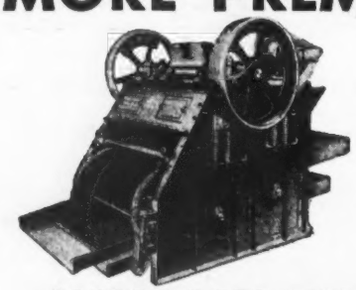

Patented Vertical Pick Breaker reduces medium size lump to egg or nut. Type B illustrated with shaking feed. Type A equipped with conveyor feed.

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MANUFACTURERS OF EQUIPMENT TO MAKE COAL A BETTER FUEL

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the supply of 27,426,471 tons in the same period last year.

In the eight-month period Canadian production amounted to 11,685,386 tons, or 6 percent less than the 12,434,353 in the first eight months of 1942, but this was offset by the increase in imports from the United States of 1,366,461 tons, or 9 percent, to 16,812,724 tons.

Local activities included such steps as the establishment of provincial and city fuel committees. With the sanction of his advisory board, Major General E. deB. Panet, regional solid fuel representative, completed the formation of seven district fuel committees throughout Quebec Oct. 16 and later will add four or five similar bodies to the list. Montreal already had its own emergency committee known as the Montreal Wartime Fuel Committee, Inc. The local committees will cooperate with local fuel dealers in endeavoring to see that no consumer runs out of fuel, to advise the public what types of fuel are available, and how to make use of substitute fuels. All committee members give their services gratuitously.

Wartime Committee Named

The Montreal Wartime Fuel Committee, Inc., was organized under letters patent issued by the Lieutenant Governor of Quebec. The new organization will have no share capital, its purpose given as being: "To carry out effectively the recommendations of the coal controller and/or similar constituted emergency government authority to deal with a possible fuel stringency, to take measures to avoid same and to so act that the citizens and the industry of the metropolitan area will not be unduly hampered and affected by the variations and climatic conditions of winter and/or other like seasons, and to make proper and convenient arrangements for such handling and distributing as may seem advisable to the committee."

Additional steps to alleviate the situation have been taken in the fields of both distribution and manpower. The Department of Munitions and Supply announced Oct. 4 the appointment of regional solid-fuel representatives in seven provinces (Nova Scotia, Quebec, Ontario, Manitoba, Saskatchewan, British Columbia and Alberta) to help solve Canada's tightening fuel problems. The announcement said the representatives will be given powers to act for the Federal Coal Controller, E. J. Brunning, to determine solid-fuel requirements in their provinces and to assist in solving problems of conservation and distribution. Similar appointments, it is expected, will be made shortly for Prince Edward Island and New Brunswick.

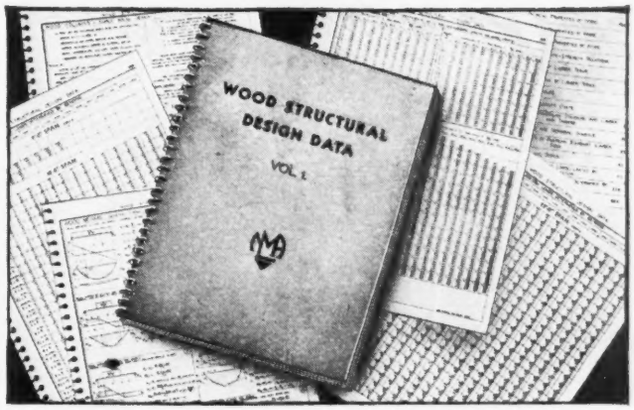
Along with these developments, the Ontario Municipal Board has rejected a plan advanced by Toronto City Council early this year for a $500,000 expenditure to set the city up in the coal business. Chairman R. S. Colter advised the Council Oct. 6.

The Department of Munitions has ruled that to assure the most equitable distribution of available coal supplies dealers now must give to consumers who have less than one-quarter of their annual fuel

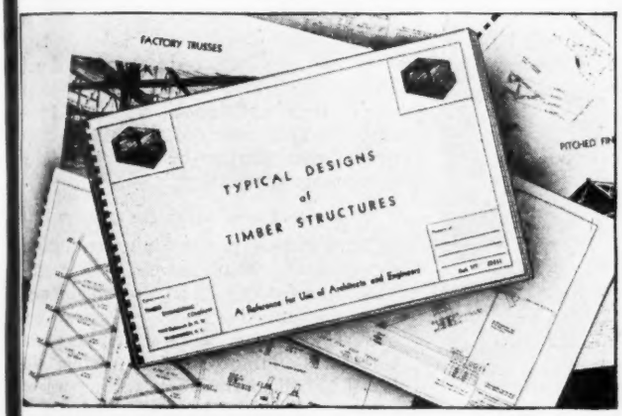
SERVICES TECO HAS FOR YOU

WHEN YOU BUILD WITH WOOD

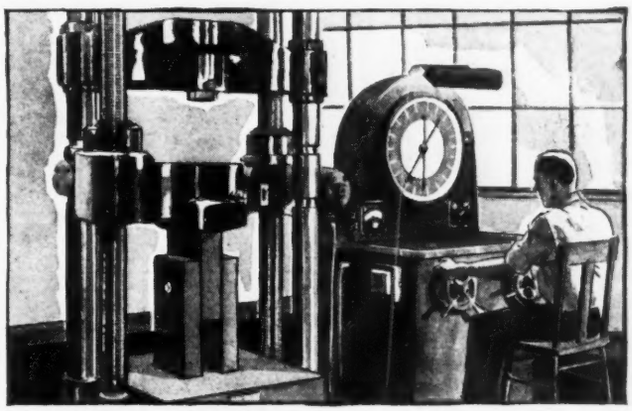
CONSULTING SERVICE. Teco maintains a staff of engineers to consult with architects and engineers on their design problems. Teco Connector distributors and fabricators in all parts of the country also render helpful services.



DESIGN DATA SERVICE. Teco has available for architects and engineers complete data on all phases of timber design, including tables and charts on timber beams, columns, floors, connector loads, bolt loads, stresses, etc.



TYPICAL DESIGN SERVICE. "Typical Designs of Timber Structures"—a 100-page book—is available to architects and engineers free upon request. Copies of several hundred other designs of typical Teco Timber Structures are also available on request.



RESEARCH SERVICE. Teco conducts a continuous research program through laboratories as well as sponsoring research at outstanding engineering colleges to increase the design knowledge of timber designers.

Wood is often referred to as the *rediscovered* material, due to its development by science for plastics, laminations and heavy construction.

Engineering science that developed the Teco Connector System of timber construction is responsible for the position timber occupies as a leading heavy construction material.

The Teco timber system serves our war effort . . . it will *serve you* in peace times too.

TIMBER ENGINEERING COMPANY
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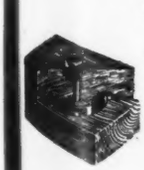

The **TECO** *Ring Connector spreads the load on a timber joint over practically the entire cross-section of the wood . . . brings the full structural strength of lumber into play.*

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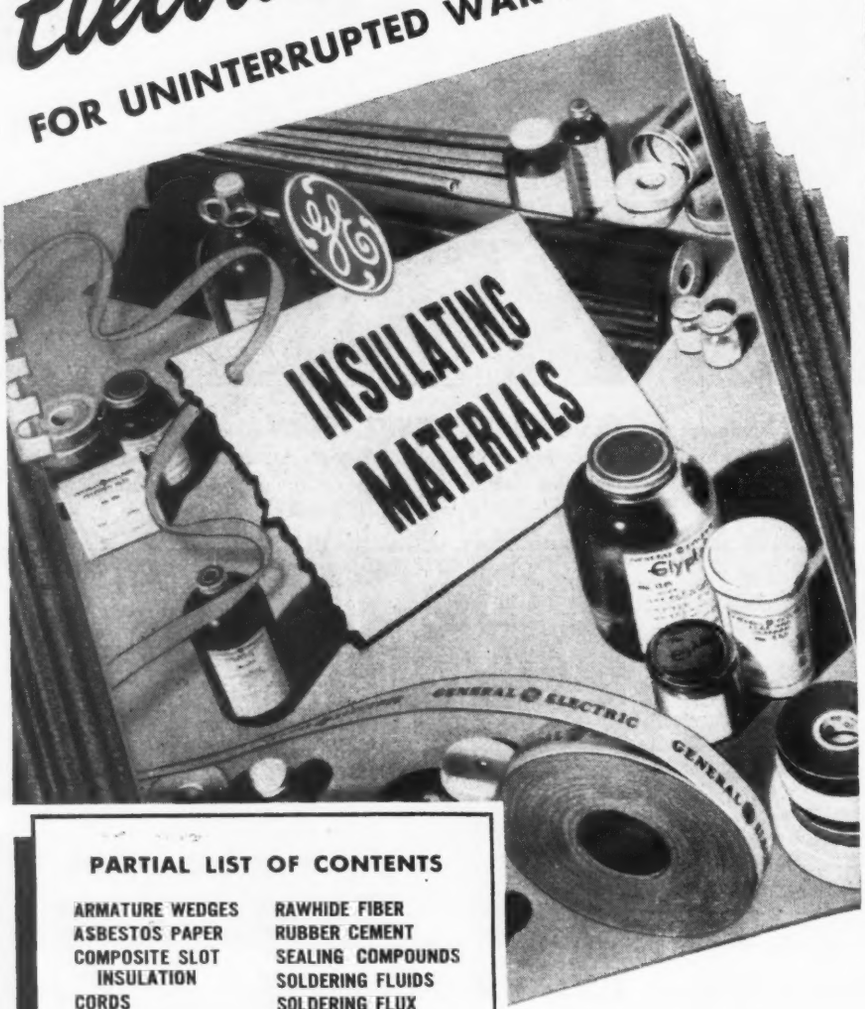
To Protect Electrical Apparatus

FOR UNINTERRUPTED WAR PRODUCTION



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VARNISHES
VULCANIZED FIBER RODS (round)
VULCANIZED FIBER SHEETS
VULCANIZED FIBER TUBING (round)

Keeping electrical apparatus on the job for uninterrupted war production is largely a matter of protecting the equipment with the right insulating materials. The What, Where, When and Why of electrical insulation is contained in this new G-E catalog. It will prove invaluable as a guide in selecting the right insulating material for every job. A copy is available from your G-E Distributor or write to Section M1132-10, Resin and Insulation Materials Division, Schenectady, N. Y.

GENERAL ELECTRIC

requirements on hand priority or deliveries up to that one-quarter. The new order, issued by Coal Controller Brunning, applies only to consumers who use less than 50 tons of coal a year. It provides that customers who agree to accept 25 percent of their requirements in Class B fuel in order to obtain 75 percent in Class A must take delivery of the former within 30 days of delivery of the Class A fuel. Class A fuel includes all anthracite coal larger than buckwheat, low-volatile bituminous coal, briquets and coke. Class B refers to all other types of coal fuel.

The Canadian Motion Picture War Services Committee, representing 1,100 theaters throughout Canada, has voluntarily agreed to a 30 percent reduction in coal consumption by the Canadian motion picture industry, the Department of Munitions announced Oct. 4. Mr. Brunning said the voluntary saving will total approximately 90,000 tons a year. He also advised Canadian householders Oct 16 to accept immediate delivery of any type of coal suited to their heating equipment rather than chance finding themselves with no coal when the cold weather begins.

Wholesalers in Canada will be required to ship anthracite coal to retailers on an equitable basis so that all dealers may have a fair share of supplies which become available, the Department of Munitions announced Oct. 4. "Unfortunately, in some parts of Canada certain dealers have been able to obtain carloads of hard coal while others have had almost none to supply their customers," said Mr. Brunning. "This new order is designed to remedy that situation by making equitable distribution compulsory."

Leave From Army for Miners

With manpower continuing critical and recruiting of civilians extremely slow, additional steps were taken to obtain men from the armed services. One was announcement of a plan for releasing men with coal-mining experience from the Royal Canadian Air Force. They will be granted six months' leave of absence, without pay, if they volunteer for the mines. There are four conditions: (1) the men must be bona-fide coal miners; (2) must be underground men; (3) all leaves will terminate on a certain date set; (4) no air crew personnel will be included. More than 200 soldiers stationed in the Pacific Command have taken leave to work in the British Columbia and Alberta mines.

One coal miner in British Columbia was fined $50 with the alternative of a 30-day jail sentence at hard labor in October under the National Selective Service job-freezing regulations. The case was tried at Fernie. A regional official of the service said it was the intention of his department to prosecute to the limit any person violating the wartime labor regulations. Two other miners in the same district charged with the same offense were permitted to return to their jobs after expressing their willingness to do so and after they had been given a jail sentence. They were the first prosecutions in the region under the act.

Labor differences in British Columbia and Alberta were responsible for establishment of a three-man royal commission to

Our troops inspect a captured Axis tank, looking for booby traps.
INTERNATIONAL NEWS PHOTO

Every battle is a showdown . . . our men, weapons and equipment against the enemy's . . . *wire rope* included. That's why our forces need the best rope they can get . . . *and lots of it.* Below are some of the ways in which *you* can help to send more wire rope over there by making your own rope *last longer* over here:

1. Start with the correct wire rope. If uncertain about size, grade or construction for your specific job, ask us or any distributor.

2. Check equipment thoroughly. Repair or replace worn, corrugated or wobbly sheaves. Line up sheaves with each other and with drums, making sure rope does not rub against flanges. Inspect drums for roundness.

3. Install rope carefully. Avoid kinking when unreeling and handling. Never drag rope across concrete or gravel. Wrap rope snugly and evenly on drum, avoiding cross-winding.

4. Break in rope cautiously, gradually increasing speeds and loads. And break in the operator, if inexperienced. Instruct him in the importance of smooth starts and stops . . . reasonable loads . . . frequent examination of rope, sockets, clips and splices.

5. Care for your rope. Clean and lubricate regularly. On many installations rope can be cut off or shifted to distribute wear. Get better acquainted with ropes by sending for our free Hand Book, "Wire Rope for Mining."

One thing more: Use wire rope of known stamina and dependability. *Preformed* Yellow Strand combines flexibility, toughness, elasticity and strength in proper balance. It stays on the job . . . curtails replacements . . . helps you keep manpower and equipment producing . . . for Victory.

Broderick & Bascom Rope Co., St. Louis

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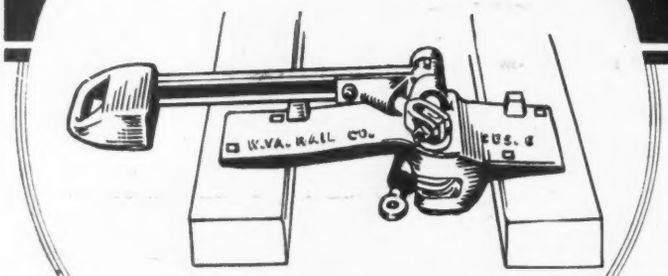
YELLOW STRAND
PREFORMED WIRE ROPE

Coal Production Depends on Haulage



...Haulage depends on Good Track!

To help you "keep 'em rolling" we can assure PROMPT DELIVERY on a number of standard track equipment replacement parts—among them the Switch Stand shown above.

Check these design and construction extras:

- **Smooth toggle action gives increasing pressure as switch points close.**
- **Extremely low but with grip and lever so positioned that the latter when rapidly thrown will not endanger the operator's feet, thus removing a fault common to many stands.**
- **Crank aligned with switch bar avoiding an offset in connecting rod and consequent bending and springing.**
- **Amount of throw easily varied by means of screw crank arm.**
- **Both crank and lever shafts have solid reamed double bearings, eliminating wear that occurs in ordinary type overhung or split bearing designs.**

Write today . . . list those items you need . . . or call in a West Virginia Rail Engineer. He'll go over your track equipment with you and make recommendations.

THE WEST VIRGINIA RAIL COMPANY

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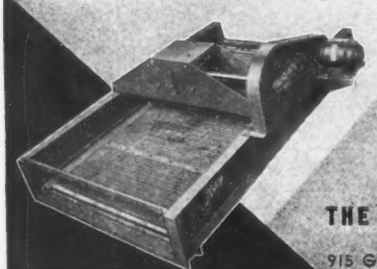
No-Blind VIBRATING SCREEN with TRI-VIBE —for Fine Mesh Screening



Leahy Screens offer many cost and labor saving features . . . vital factors in today's wartime demands for greater production. For more efficient coal screening—it's Leahy Screens.

THE DEISTER CONCENTRATOR COMPANY

The Original Deister Co., Est. 1906

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investigate wage rates paid in these provinces and all matters relevant to or affecting application of the wartime wage control order in respect to such wages, announced Oct. 16 by Humphrey Mitchell, Federal Minister of Labor.

Angus Morrison, secretary for District 18, United Mine Workers, said a vote was overwhelmingly in favor of a strike to settle wage grievances. The affirmative totaled 7,849 and the negative 399, with 53 spoiled ballots. The miners seek two weeks' holiday with pay for those who have been employed for a year or more. They also ask for $2-a-day wage increase, as well as time and a half and rate and a half for the sixth day of the week. The district union has agreed to submit its demands to a tribunal, provided it includes one labor man approved by the district executive, it was announced at Calgary, Alberta, by Justice O'Connor.

•

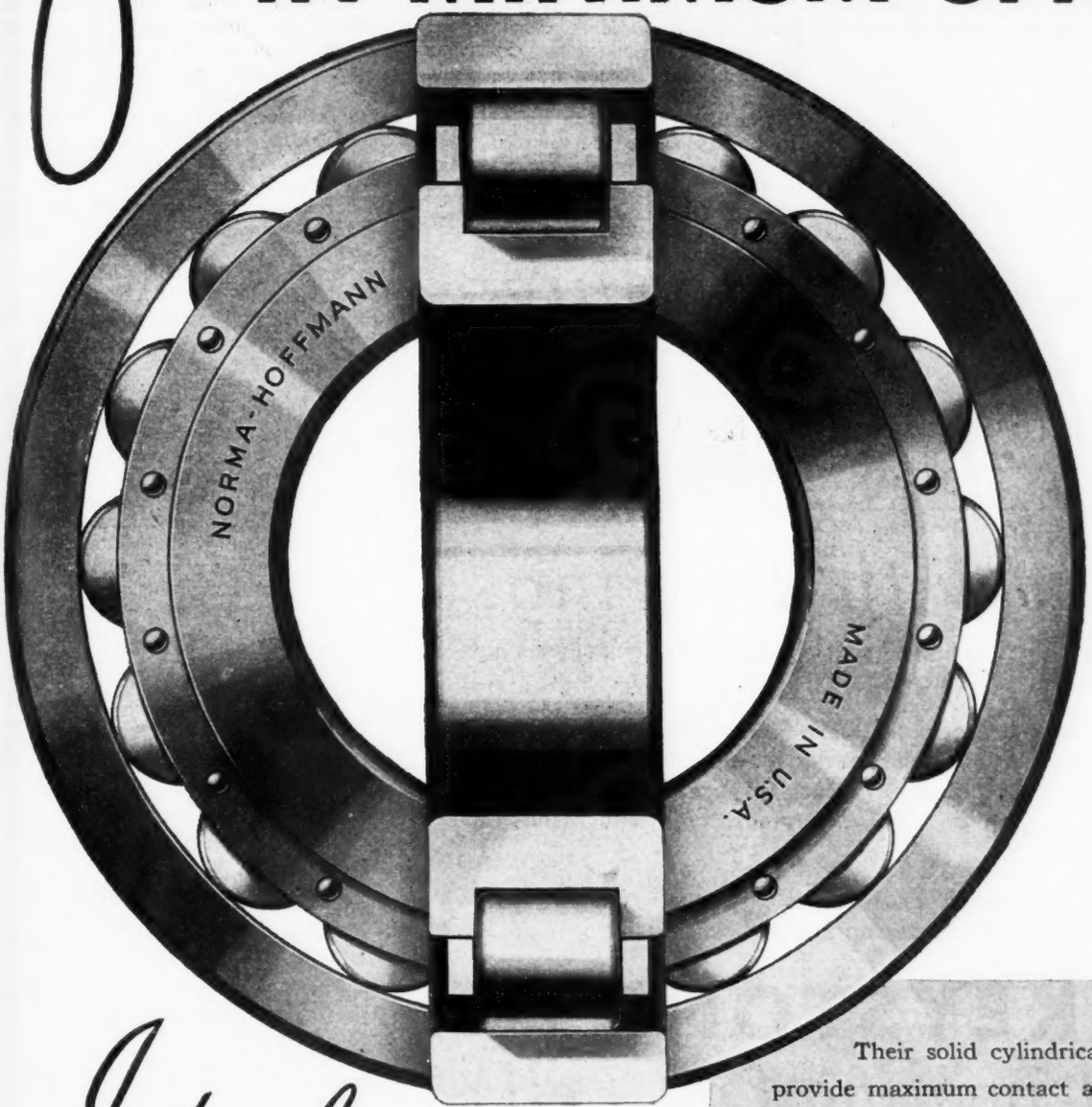
Anthracite Group Plans Automatic Heat

A major development in domestic-fuel heating which promises to lift anthracite coal to popularity rivaling that of oil and other competitive fuels was reported in Philadelphia, Oct. 3. It is an organized campaign to introduce modern thermostatically controlled anthracite-burning equipment generally throughout the Atlantic seaboard states. As a companion move, "furnace-man" services will be made available. As a result of the introduction of modern temperature-control equipment and the availability of the manual services in firing, cleaning and ash disposal, it will be possible for anthracite consumers to operate their heating plants fully as automatically as are the most modern equipment burning furnace oil and fuel gas.

The development has been spurred to a great extent by the determination of an important group of anthracite interests, including some of the principal anthracite producers, to permanently hold and expand their enlarged wartime market. The campaigns are now under way. The furnace-man services are to be made available in carefully picked "test-tube" communities at the outset of the 1943 heating season.

The mass campaign to modernize anthracite coal-burning equipment in the North Atlantic states has been undertaken by a corporation known as Automatic Coal Burner Co., Inc., which was organized two years ago by the Lehigh Coal & Navigation Co. and sold recently to the anthracite producers' groups. The president of the corporation is Charles A. Connell, of Philadelphia. Mr. Connell has had broad experience in both wholesale and retail anthracite sales. He was with the Anthracite Institute for ten years. During the latter years of this service he was general manager of the institute's anthracite coal service. During the last ten years he has been in the retail coal business, devoting his time to merchandising anthracite and anthracite-burning equipment.

for MAXIMUM CAPACITY IN MINIMUM SPACE



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WITH SINGLE-ROW BALL BEARINGS

NORMA-HOFFMANN

PRECISION ROLLER BEARINGS

NORMA-HOFFMANN BEARINGS CORP'N.,

STAMFORD, CONN., U. S. A. • *Founded in 1911.*

Write for the Catalog. Let our engineers work with you.

Their solid cylindrical rollers provide maximum contact area, giving larger load and shock-absorbing capacity than any other single-row bearing of like dimensions. Thus, when NORMA-HOFFMANN PRECISION ROLLER BEARINGS are used in place of ball bearings, a greater factor of safety is provided, together with added life, particularly under vibration and overload. PRECISION qualities in workmanship and materials adapt them alike for both low and high speeds.

Robert V. White, of Philadelphia, president, Lehigh Coal & Navigation Co., is chairman of the board. Members include C. W. Stone, general sales manager, M. A. Hanna Coal Co.; G. B. Fillmore, vice president, Hudson Coal Co., Scranton, and H. J. Connolly, president, Pennsylvania Coal Co., Scranton.

The manual service associate is known as Furnaceman, Inc., and also is headed by Mr. Connell, who will have charge of the conduct of both campaigns from Philadelphia.

The drive to modernize existing anthracite equipment, according to Mr. Connell, has been started already in both the industrial and home heating fields instead of waiting for the end of the war when new equipment will become generally available.

For industry, faced with the need for war-time fuel conservation, Illinois chain-grate stokers, Carbondale pin-hole grates with thermostatically controlled blowers, and Iron Fireman automatic stokers are being supplied. This service continues the program begun before the organization was taken over by the industry group.

For the home owner, Automatic Coal Burner Co. is providing several services. For present equipment an experienced heater repair service is available. Automatically controlled temperatures throughout the day, and a warm bathroom and warm first floor can be provided by installation of a thermostat control, which is available either for purchase or on a low-priced rental basis. Hot-water regulators also are available to provide ample supplies of hot water.

Through Furnaceman, Inc., anthracite users can employ a furnace-man to relieve themselves of all or any part of the firing or ash-removal chores. If, as is often the case, the handling of ash is the only objection, an alternate to daily Furnaceman service is offered through the installation under present heaters of a prefabricated ashpit in which a bushel can is placed to receive ashes directly from the grate. This banishes the shoveling of ash; ashcans, as filled, are simply exchanged for empty cans either by Furnaceman or by the consumer, as he desires. The pit and can may be used in connection with an automatic stoker if complete automatic heating is desired after the war.

For the new homes now being built in war-production areas, Automatic Coal Burner Co. has designed and is introducing a brand new assembly of an overhead coal bin from which domestic sizes of anthracite can be fed in measured quantities directly to the heater by the simple process of stepping upon a foot pedal. Ashes are deposited directly from the grate into full-size receptacles. The fire is controlled by a room thermostat. This equipment provides automatic heating without the use of motors and without shoveling coal or ash. Additional equipment for the better utilization of anthracite is now being developed and much more is expected when more materials become available.

The first "test tube" locality for initial tests of the services to be offered by Furnaceman, Inc., will be in suburban Lansdowne, Pa., near Philadelphia, where the tests can be closely watched. At least two other trial communities will be selected within the next few weeks, one in northern New Jersey, the other in central New York.

As the problems connected with the conduct of such a highly organized manual service organization are worked out, the services of both Automatic Coal Burner Co. and Furnaceman, Inc., will be extended throughout the northeastern states so as to give complete coverage in the anthracite market.

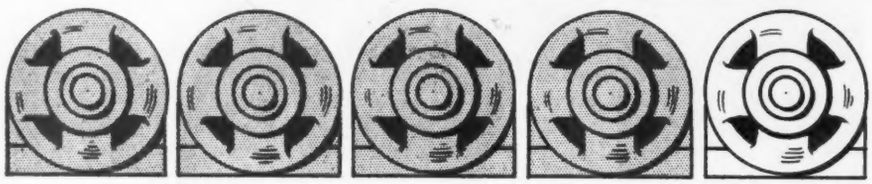
The manual services to be offered, according to present plans, include all those requisite to the normal firing of a domestic heating plant, including keeping the equipment in condition for operation at top efficiency. A variety of services will be offered to subscribers, depending upon their requirements and ability to pay.

•

War Bonds as Prizes For Steady Workers

To promote capacity output and curtail absenteeism among its coal-mine-workers, the Tierney interests, comprising the Eastern Coal Corp., Tierney Mining Co. and Premier Pocahontas Collieries Co., is offering prizes of war bonds for steady workers. The companies, which operate in West

4 out of 5 Failures



Start with Bearings

When a motor is mounted on sleeve bearings, trouble is not inevitable—but it is likely.

Oil lubricant is used on sleeve bearings (instead of the grease required by Ball Bearings) and, in time, this oil impregnates most of the motor. It accumulates dust on coils, and carbon on D. C. commutators, and results in failure.

Wear on the sleeve bearings and journals causes other troubles—which you know about.

KEYSTONE
Ball Bearing End Bells

forestall these difficulties. They can be slipped on your present motor shafts (with remarkably little shop work) and they will fit perfectly. We have systematized the production of KEYSTONE equipment—to save you money—and to give you improved motor service.

When you write for information, send us nameplate data from a motor which you are repairing, and learn how little it costs to put it on Ball Bearings—the KEYSTONE WAY.

KEYSTONE Electric Company
1224 RIDGELY STREET . . . BALTIMORE . . . MD.

Sinews of Shipbuilding

Wire rope is the sinew of shipbuilding. In small electric hoists in machine shops, in giant cranes that pick up a turbine or gun turret and swing it into position, wire rope is the linkage which makes possible smooth and rapid handling of materials and sub-assemblies.

Bethlehem is supplying a tremendous amount of wire rope to shipyards. Powerful dredge ropes to keep open wet basins and launching basins . . . crane ropes of all sizes . . . ropes to lift, pull, and guy . . . and ropes for the thousands of rigging jobs on the vessels themselves.

Enormous as is shipbuilding's total wire-rope demand, it is in addition to the vast quantities needed in war plants, oil fields, mines, quarries and transportation. Bethlehem's wire-rope mill is working full-tilt to supply war needed wire ropes for military and naval applications, and essential uses on the home front.

BETHLEHEM STEEL

Virginia and Kentucky, explain the plan in their semi-monthly magazine, the *Red Robin*, as follows:

"TO THE SOLDIERS OF PRODUCTION ON THE HOME FRONT

"Your government has declared that every American worker engaged in producing essential war materials is as necessary to the victorious outcome of this war as any soldier, sailor, marine or flier. You are the soldiers of production on the home front without whose most earnest efforts this war cannot be won.

"Nearly nine out of every ten tons of coal produced at our mines goes directly to war production plants—and still our government urges us to ship more and still more each day.

"Therefore, in recognition of those outstanding soldiers of production, our companies propose to try, beginning with the work period starting Oct. 16, 1943, a plan whereby the men who have worked each and every working day during a work period will be entitled to participate in a drawing for a War Bond Prize. In addition every worker who qualifies to participate in these drawings will be awarded a specially designed "100 Percent Worker" pin for that period.

"*Those Who Will Be Eligible*—All day or tonnage men at each mine or tipple except the supervisory force.

"Each such employee who has not been absent from work for any reason on any working day during the full work period.

"If a man has reported for work at the beginning of his shift and is sent home by his foreman for reasons beyond the man's control, such as slate fall obstructing his place, water in working place or any other similar cause, he will be eligible to participate in the drawing.

"*Work Period Prize*—A few days after the end of each work period there will be two drawings each at Premier, Tierney, Stone and Hardy and three at McVeigh. The prize at each drawing will be a $25 War Bond. In addition each man who qualifies to participate in the drawing will be awarded a work period "100 Percent Worker" pin.

"*Three Months' Period Added Prize*—At the end of a three months' work period every worker who has qualified to participate in all the preceding work period drawings will be entitled to participate in an added drawing of a grand prize of a $100 War Bond. One such drawing will be held at Premier, one at Tierney, one at Stone, one at Hardy, and one at McVeigh. In addition every worker who has qualified to participate in the grand prize drawing will be awarded a specially designed sterling silver "100 Percent Worker" button.

"Remember, any employee who has failed in perfect attendance record will be disqualified.

"The companies reserve the right to discontinue this plan at the end of any three months' work period.

"EASTERN COAL CORP.
TIERNEY MINING CO.
PREMIER POCAHONTAS COLLIERIES CO."

•

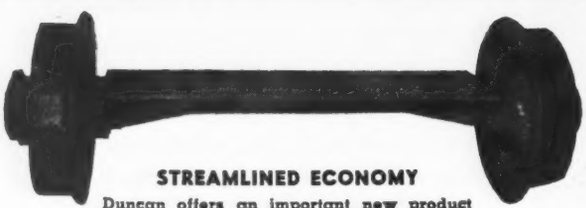
Mining Machinery Ratings Raised

On recommendation of the Combined Production and Resources Board of the United States, the United Kingdom and Canada, the War Production Board has granted higher preference ratings for the production of coal-mining machinery. The recommendation was made on the basis of a report by CPRB's Combined Coal Committee, of which Howard Gray, Deputy Solid Fuels Administrator for War, is chairman.

The critical situation in coal mining machinery was discussed at the recent meeting of the Mining Machinery Manufacturers' Advisory Committee. To meet this situation, a portion of the manufacturers' program for the most critical types of equipment such as locomotives, shuttle cars, mine cars, cutting machines, mine crawler trucks, conveyors, loading machines and electric coal drills is to be uprated from AA-2 and AA-2x to AA-1 for the first half of 1944. The uprating will apply principally to necessary components and the use of facilities, in the manufacturers' own or other plants, to enable them to meet production schedules for this vital equipment.

Some relief from the serious shortage of truck replacement parts is in sight as a result of the Oct. 11 amendment to Limitation Order L-158, which uprates the

Modern low cost answer to immediate mine-car needs··



STREAMLINED ECONOMY

Duncan offers an important new product that eliminates vitally important mill shapes not now easily procured.

SUPERIOR BY TEST

The following results were obtained by placing two axles in hydraulic press, each bolted flat on face of press and bent to a 30° angle on each end of axle: CAST AXLE . . . 225 tons—ROLLED AXLE . . . 200 tons—neither axle showing a sign of fracture.

DUNCAN Integral-Cast STEEL AXLE

Eliminates the need of

1 ROLLED AXLE
1 ROLLED CHANNEL
2 SHRUNK-ON DUST COLLARS and
2 CAST-STEEL BOXES

Carefully controlled chemical properties and careful heat treating of cast steel axles will equal the strength of rolled axles. Cast axle weighs only 125 lbs. complete — eliminating 225 lbs. of weight.

STEEL MINE CAR WHEELS AND TRUCKS TO ANY SPECIFICATIONS

Duncan is headquarters for all steel mine car wheel and truck requirements; loose and tight wheels with ball, roller, or sleeve bearings; continuous and roller-bearing trucks, etc. Write us about your requirements.

DUNCAN FOUNDRY & MACHINE WORKS, INC.

ALTON, ILLINOIS

Load All Bearings This Right-Angled Way

. . . and help check the decline in output-per-man-hour

ROLLWAY'S RIGHT-ANGLED BEARING LOADING

reduces down-time for service & replacement

Deterioration of equipment . . . loss of manpower . . . and cumulative labor fatigue . . . ALL are steadily reducing output per worker in war and civilian industry. Every help that can keep shifts operating at top efficiency . . . and machines running without shutdowns . . . is of utmost importance now.

● All radial loads carried at right angles to the roller axis.

● All thrust loads carried at right angles to the roller axis.

Cut Down on Shut Downs with Rollway Right-Angled Bearings

Rollway Roller Bearings wear longer . . . require less maintenance . . . and provide greater carrying capacity in given dimensions, because they *simplify* the load, *reduce* the pressures per bearing and per roller. Rollway splits every load into its two simplest components of *pure radial* and *pure thrust*. Each component is carried at *right angles* to the roller axis by *separate* bearing assemblies. No oblique loads and resultants, no thermal float or uncalculated thrust can impose secondary pressures on *any* Rollway Bearing.

Choose Your Bearings with Care

The torque and life of roller bearings are greatly affected by selection of the proper size and type. Send drawing or detailed description for free bearing analysis and recommendation. No obligation. S.A.E. or American Standard metric dimensions and tolerances available for most applications.

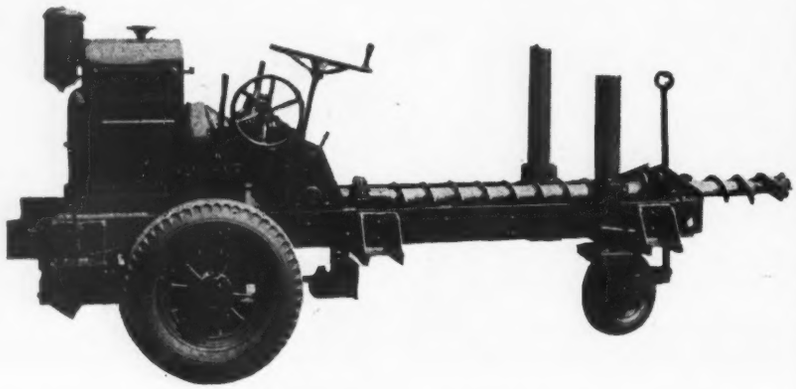
ROLLWAY BEARING COMPANY, INC., SYRACUSE, NEW YORK

BUILDING HEAVY-DUTY BEARINGS SINCE 1908 — **BEARINGS**

PARMANCO Horizontal Drills

"Positive Control Drilling"

Parmanco Horizontal Drills give you "Positive Control Drilling." Parmanco Vertical and Horizontal Drills are today's leaders in low cost, low maintenance drilling—All Parmanco Drills are equipped with patented Parmanco augers. Used by leading strip mine operators—Write us your drilling problems.



PARIS MANUFACTURING CO.

PARIS, ILLINOIS

GRUENDLER CRAFTSMANSHIP ...
Employed by Coal Producers

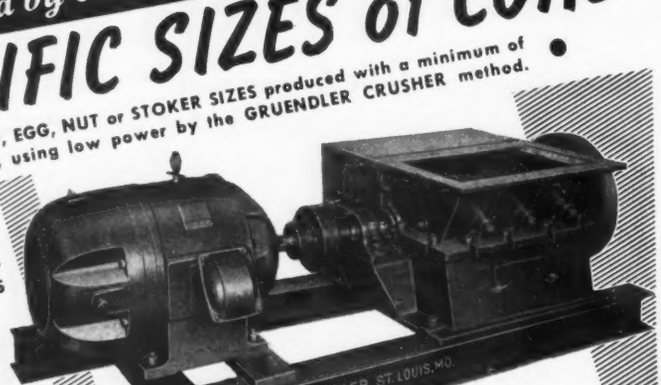
SPECIFIC SIZES of COAL

● LUMP, EGG, NUT or STOKER SIZES produced with a minimum of fines, using low power by the GRUENDLER CRUSHER method.

Patented... TWO-PIECE HAMMERS or RING HAMMERS

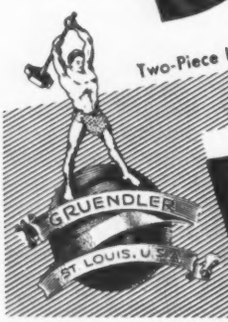
Ring Hammer

Two-Piece Hammer



A crusher utilizing small space and accomplishing new highs in coal production.

GRUENDLER builds a complete line of coal crushing equipment includes both single and double roll crushers. Bulletins sent on request.



GRUENDLER
CRUSHER and PULVERIZER Company
St. Louis, Mo.

production and distribution of these items. The amended order provides that in the last quarter of 1943 and the first quarter of 1944 the production and distribution of replacement parts for medium and heavy trucks, truck-trailers, passenger carriers, off-the-highway motor vehicles and motorized fire equipment must be handled as if orders therefor bore a preference rating of AA-1, instead of the AA-2x level previously set. Replacement parts for passenger automobiles and light trucks must continue to be produced and shipped as if orders therefor bore a rating of AA-2x.

WPB's Mining Division is now collaborating with the Textile Division in an effort to eliminate some of the red tape now involved in purchasing procedure in acquiring various textile items such as brattice cloth, ventilating tubing, filter duck, gloves, sash cord, twine and rope. It is expected that a working agreement will be reached soon and that relief in this direction may be forthcoming at an early date.

Another step in WPB's program of decentralization was taken Oct. 8 through a revision of Priorities Regulation No. 16 covering the handling of appeals from various "L" and "M" orders. The list of orders from which appeals must be filed with WPB regional offices has been expanded from 63 to 188, and now includes such orders as L-53—Track-Laying Tractors and Auxiliary Equipment; L-53-b—Repair Parts for Track-Laying Tractors; L-100—Compressors; L-246—Pumps, and the various lumber orders L-218, L-290, M-208 and M-209.

•

Coal Crisis Eased By Colloidal Fuel

Easing of the impact of fuel shortage as well as the saving of many lives of men on torpedoed ships will result from the use of pulverized-coal-in-oil fuels, John V. Pyle told members of the American Society of Mechanical Engineers Oct. 13 at a meeting of the fuels and steam-power divisions of the Metropolitan Section of the society at the Engineering Building, New York City.

Mr. Pyle, manager of the steam division, Kennedy-Van Saun Mfg. & Engineering Corp., New York, told how his company began experiments with colloidal fuels in 1928, dropped them because fuel was plentiful, but renewed its experiments when the war brought the fuel crisis. Two plants are now about to open, one serving two large paper mills in Maine and the other a steel mill in Ohio, where the fuel, burned in open-hearth furnaces, is expected to increase output 10 percent.

The British division of the company, the Sheffield Coal & Iron Co., took up the experimentation when it was dropped here and is already supplying colloidal fuels to locomotives, power plants and ships, he said. The saving of men on torpedoed ships will result from the fact that, mixed with carbon, the oil does not remain on the water's surface.

EMERGENCY REPAIRS TO MEET WAR TIME NEEDS

•

HOW TO GET ACTION WHEN A BREAKDOWN OCCURS

The emergency repair department of Robert Holmes and Brothers can be a real asset to you when a breakdown occurs and needed repairs to keep up war production must have immediate attention. Because they are special engineers in m i n i n g equipment — because they have a plant behind them geared to war-time demands the Emergency Repair Department feel sure they can be of real service to you should the occasion demand, just as they have been to many others.*

It is an easy matter to get their services. Phone 1430—Danville, Illinois, and tell your problems to our Emergency Repair Department. Immediately a specially trained engineer will make arrangements to get you back in operation with the least amount of time out.

**Recently a mine in Kentucky informed us they had a broken crankshaft on their hoist. A new crankshaft was made, installed and they were back in operation in six days. (Name of mine on request.)*

ROBERT HOLMES AND BROS.

BINS - GATES - LOWERING SPIRALS - DUST-O-LATORS - SHAKING GATES

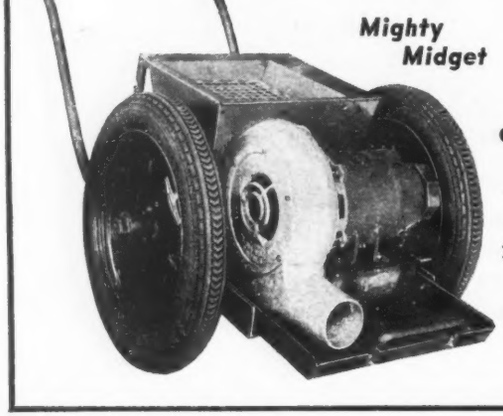
DANVILLE, ILLINOIS

Speedy Dustributing

Let us demonstrate this Mighty Midget Dustributor in your mine. The speed with which you can achieve safety at mining faces will save dollars as well as accidents. The time measured in man hours will pay for this piece of equipment in a short time. The Mighty Midget can be conveyed on coal car, shuttle car, and on some conveyors. Steel tires on cart for the duration.

AMERICAN MINE DOOR CO.

2057 Dueber Avenue — Canton, Ohio



Mighty Midget

Overall Length 45"

Overall Height 18½"

Dust Deilvery 34 lbs. per min.

Regular performance 7 tons dust per shift. Maintenance cost practically nil.

Overall Width 22"

ELIMINATES HAND SWITCHES

It changes the current from trolley to reel automatically, eliminating shocks and burns to the operator. Built for 250 and 500 volts, for either single or double trolley and reel service.

INCREASE PRODUCTION AND PROMOTE SAFETY

THE POST-GLOVER ELECTRIC CO.

• ESTABLISHED 1892 •

221 WEST THIRD STREET, CINCINNATI, OHIO

New Books on Coal And Coal Subjects

National Fire Codes for Flammable Liquids, Gases, Chemicals and Explosives, 1943, National Fire Protection Association, 60 Batterymarch St., Boston, Mass. 504 pp., 6x9 in., cloth. Price, $3. Suggested ordinances, standards and recommended practice.

Manual of Instructions on Proper Firing Methods in the Interest of Fuel Combustion and Conservation; Air Pollution and Smoke Elimination; Smoke Prevention Association, Inc., 1943. 139 North Clark St., Chicago. 8½x10⅞ in., mimeograph; paper. Price, 25c., for mailing, etc.

Coal Resources of the Douglas Group in East-Central Kansas, by Arthur L. Bowsher and John M. Jewett, State Geological Survey of Kansas, Lawrence, Kan. Bull. 46, 94 pp., 6x9 in.; paper. Price, 25c., for mailing.

Fires in Surface Mining and Milling Structures by D. Harrington and J. H. East Jr. U. S. Bureau of Mines, I. C. 7250, 9 pp., 8x10½ in., mimeograph; paper.

How to Maintain Electric Equipment in Industry. General Electric Co., Schenectady, N. Y. 372 pp., 8x10¾ in.; cloth. Price, $1.75.

Mechanical Loading of Coal Underground, by Ivan A. Given, Coal Age. McGraw-Hill Book Co., Inc., New York City. 397 pp., 5¾x9⅛ in., cloth. Price, $4.

Too much material hitherto printed on this subject covers merely details of construction of the machines for performing the work. This volume is more complete. It covers coal-loading principles and essentials, crews, unit production, mechanical slope sinking and entry-driving, mechanical mining plans for conveyor, scraper and mobile loading equipment, face preparation, power and maintenance for mechanical loading. It emphasizes the "how" of the job rather than the "with what." The author got most of his information in trips made underground, so that the book is intimate, practical and instructive. This volume will direct the man who contemplates the installation of mechanical equipment for loading and those also who have introduced it and wish to learn still more from the experience and practice of other mechanical loading operators and managers. A must for the office and mine circulating library.

•

Utah Hires Women

For the first time in its 55 years of operation, the Utah Fuel Co., operating in Carbon County, Utah, is making use of women in production. It has about 15 women as bone pickers and, according to mine officials, they are proving satisfactory. Most of them are married. State law forbids employment of women in the mines. The women get the same wages

as men for similar work. The company has built a rest room with all facilities. Should women continue to prove satisfactory and willing, it is stated, they may possibly be given other outside jobs at the mines.

•

1941 Income Shown For Soft-Coal Producers

Out of 1,890 filed returns from bituminous coal companies operating as corporations in 1941, 859 show a net income of $56,831,000 and 863 show a deficit of $14,180,000, according to figures released by the Bureau of Internal Revenue. There were 168 returns from inactive corporations. These figures show the aggregate profit of the coal corporations as $42,651,000 before deduction of federal taxes. Profit for the industry after deduction of federal taxes, amounting to $19,065,000, was $23,586,000. These returns, however, cover other activities of the corporations.

Figures issued by the Bituminous Coal Division (now Solid Fuels Administration for War), which are confined to coal production, show an average cost of $2.1209 per ton for 1941 and an average realization of $2.1940, or a profit of 7.31c. per ton. Applied to total output for 1941 this shows a profit of $37,584,000. As only those costs authorized by the Coal Act are included in Coal Division cost figures and these cost figures do not in many instances include all items of expense, its figures do not present a true picture. In any event, they reveal the coal industry reaps a profit, if any, of only a few cents per ton.

According to Revenue Bureau figures for the bituminous coal industry, the net profit per company (before taxes) was $24,768, while the net profit for all mining and quarrying other than bituminous coal was $42,316 per company; for all manufacturing, $123,527 per company, and for all industrial groups, $34,832 per company.

•

Anthrafilt Gains in Use As Filter Agent

That anthrafilt, the filter material made from specially prepared anthracite, continues to attract new buyers and more applications is indicated by the fact that sales for the first nine months of 1943 were 44 percent ahead of the corresponding period in 1942. Repeat orders under Lend-Lease are being shipped to Russia for conditioning boiler-plant water. Among swimming pools that formerly used sand as the filter medium several score have switched to anthrafilt in recent months. Groups of schools and colleges in Pittsburgh, New York, Rochester and other cities have made purchases.

All-time top in individual orders was reached in September when 1,950 tons was ordered by one of the large water-equipment builders at the direction of America's largest chemical organization.

A NEW POSITIVELY HELD-IN
4-POINT BIT

McLaughlin No. 4AT

Bit No. 4AT is another example of McLaughlin ability to design bits that offer the utmost in ability and long time economy.

No. 4AT requires no wedges — It can be placed in head without tools, and important too, is the design with fewer parts. NO LOST BITS — NO WEDGES TO LOSE.

Bits are hard surfaced and in actual use NOW are giving four to five times more wearing service.

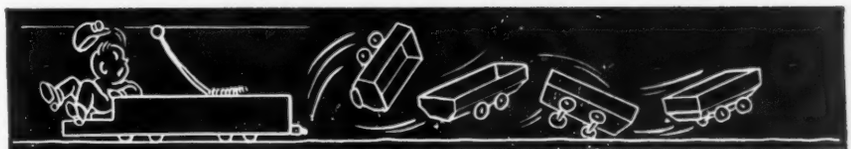
Heads can be furnished in three sizes:
No. 33 head drills a 2⅜" hole
No. 24 head drills a 2⅝" hole
No. 25 head drills a 3⅛" hole

Suitable for welding to common twist or conveyor augers.

Write for full particulars

See our full page advertisement in Coal Mining Catalog 1943 Edition.

McLAUGHLIN
MANUFACTURING CO.
Joliet, Illinois

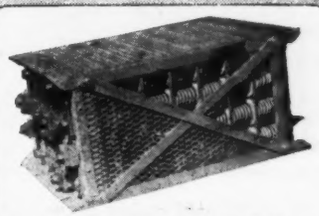


G.M.C.
RESISTANCE IS BUILT TO "TAKE IT"

This locomotive resistance is built in a sturdy steel framework . . . is comparatively light in weight . . . and is amply insulated . . . in short it is built to take tough mine service.

It has ample resistance to start your locomotive smoothly on the first point . . . taps are so located that locomotive will accelerate smoothly . . . sufficient carrying capacity is provided to handle any overloads to which locomotive may be subjected.

It is easy to install — comes in complete unit — no interconnection between units necessary — no frame construction required. Want further details? Write for G. M. C. Resistance booklet.



DISTRIBUTORS

Mill & Mine Supply Co., Birmingham, Ala.
Close Distributing Co., Pittsburgh, Penna.
W. M. Hales Co. . . . . Danville, Ill.
Chicago, Ill.
Benton, Ill.
Hillsboro, Ill.
Orville Phipps . . . . . Denver, Colorado
Wilkes-Barre Equipment Co., Wilkes-Barre, Penna.
Mechanical Mining Service, Wheeling and Morgantown, W. Va.

GUYAN MACHINERY COMPANY
LOGAN, WEST VIRGINIA

FOR PROOF CHAIN STRENGTH

write "Missing Link" on your chain repair link orders

You get "Pressed Fit" only with genuine Laughlin "Missing Links"

The drop-forged, heat-treated "Missing Link" is press-fitted together under pressure, matching the parts so there is no play, no shearing action on the rivet. Under stress the rivet merely holds the "Missing Link" together, and does not take the load.

THE "MISSING LINK"

Drop-forged steel, heat-treated. Sizes from 3/16" — 1 7/8"

THE PEAR SHAPE "MISSING LINK"

The link with larger inside dimensions. Each link drop-forged and heat-treated.

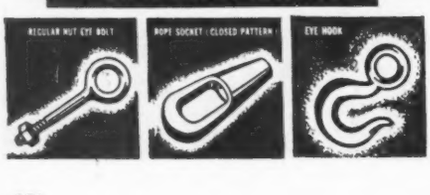
Save time, increase safety by specifying
The Genuine "Missing Link"

Write for latest catalog on Laughlin Industrial Hardware.

Distributed Through Mill Supply Houses

Look for Laughlin Products in Coal Mining Catalogs

THE THOMAS LAUGHLIN Company
PORTLAND, MAINE



The entire water requirements of a large plant and village in the Pacific Northwest will be filtered throughout with anthrafilt. Although the largest recent individual application of anthrafilt, this job follows the same water-filtering ideas used in more than 100 large war plants or in industries closely allied with the war effort where anthrafilt is in constant use. Since many filter plants cannot be built under war-time restrictions, anthrafilt has been pressed into service with an increase of 25 to 100 percent in capacity.

•

Qualified Foremen and Firebosses Upheld

The Utah State Industrial Commission has no authority to allow the State Coal Mine Inspector to grant temporary permits for persons to act as mine foremen or firebosses, according to a ruling just made by Attorney General Grover A. Giles. Mr. Giles said the legislature evidently recognized the importance of having none but competent men in these positions and therefore set forth a specific manner for determining the qualifications of applicants, and the law permits no deviations. The Attorney General also pointed out that under the law, suit can be brought against a mining company if a miner is killed or injured through an accident in a mine employing a non-certified foreman or fireboss.

As a result of the decision, the State has announced examinations for additional mine foremen and firebosses to relieve the shortage. The tests are being held in Carbon County.

•

Hard Coal Reserves To Last 160 Years

Sufficient anthracite remains underground to last 160 years at present depletion rates, according to a report Oct. 13 by the Pennsylvania Department of Internal Affairs. A survey made by the department and Pennsylvania State College put unmined tonnage at 16,192,000,000, divided as follows:

Northern Field—2,602,000,000 tons, with an estimated life of 50 years; Eastern Middle Field—95,000,000 tons, 10.5 years; Western Middle Field—3,528,000,000 tons, 156 years; Southern Field—9,967,000,000 tons, 523 years. This compares with an estimate of 18,317,237,000 tons in 1922 made by Dever C. Ashmead in a survey for the U. S. Coal Commission.

The Department of Internal Affairs reported that, allowing for losses, the depletion of the various fields since 1922 had been:

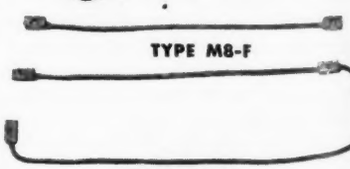
Northern Field—1,068,000,000 tons, or an annual average of 50,857,000 tons; Eastern Middle Field—183,328,000 tons, annual average 8,730,000 tons; Western Middle Field—480,984,000 tons, annual average 22,904,000; Southern Field, 396,920,000 tons, annual average 18,900,000 tons.

Use
MESCOWELD RAIL BONDS
★ ★ ★
INSURE AGAINST POWER WASTE AND PROFIT LOSS

★ It is essential that you get the power you pay for at the face or you are losing profits. Insure against this waste by using Mosebach Flashweld Rail Bonds.

The Mosebach electric flashweld method provides an absolute connection between the end of each individual wire in the copper cable and the forged steel terminal. This increased strength, and decreased resistance, results in greater production and less "down time"

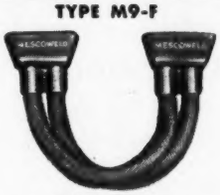
TYPE M8-F



TYPE M8-F

TYPE M8x-F

TYPE M9-F



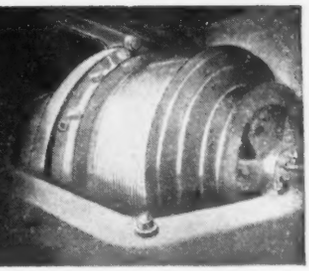
TYPE M10-F

TYPE M5-F

Mosebach Rail Bonds are made in 18 styles to meet every bonding need. Write for complete details.

MOSEBACH
Electric & Supply Co.
1115 Arlington Ave., Pittsburgh (3), Pa.

TIPS FROM MANUFACTURERS



Reducing Wear On Locomotive Wheels

The nature of service to which yard switch engines are subjected unavoidably causes severe wear on the driving-wheel tires and flanges. Most yard trackage systems involve sharp curves, numerous switches and imperfect rail joints, all contributing to early wearing of locomotive tires. This condition can be avoided by flame-hardening the surfaces subject to wear.

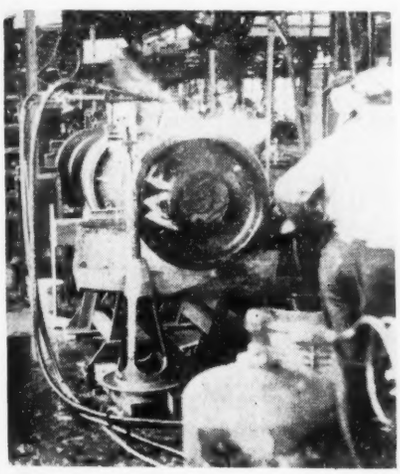


Fig. 1—A simple, improvised set-up for oxyacetylene flame-hardening of wearing surfaces on switch-engine tires.

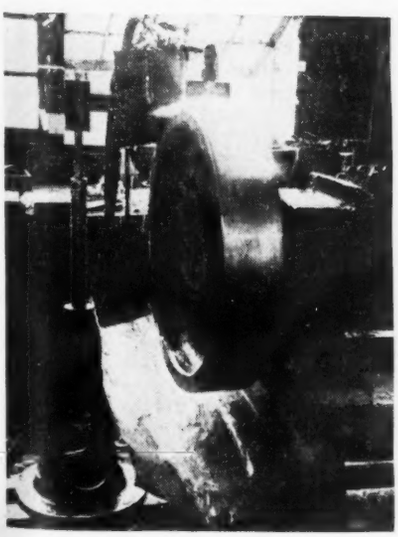


Fig. 2—The wheel is mounted to rotate at a circumferential speed of 5 in. per minute while flames and water quench operate simultaneously (being a center driving wheel, it has no flange).

As practiced in one large plant, the hardening operation is done as occasion warrants by setting up the tires individually on a slowly rotating mount, with an improvised support for the oxyacetylene torch and water quench, as shown in Fig. 1 (supplied, with Fig. 2, by Air Reduction Sales Co.). A standard 4-in.-wide Airco flame-hardening tip with self-contained quench is mounted over the wheel, which is set to rotate at a peripheral speed of 5 in. per minute. At this speed the surface is hardened to a depth of $\frac{3}{16}$ to $\frac{1}{4}$ in.

The original hardness averaged between 220 and 225 Brinell, but after the flame-hardening the reading is 600 to 640 Brinell. These high hardnesses are readily obtainable by the oxyacetylene flame on steels such as the high-carbon chrome-nickel composition of these switch-engine wheels. The first set of hardened wheels has shown no appreciable signs of wear after 14 months of service, compared with six months for unhardened wheels.

Wire Nuts

Ideal Commutator Dresser Co., Sycamore, Ill., offers wire nuts consisting of a molded shell with a conical shaped spring wire insert. When screwed onto the ends of wires these nuts twist and compress the wire together into a tighter and tighter joint—and the wires remain under compression. The nut joints are said to stand up under almost $3\frac{1}{2}$ times the pull that the best soldered joint will withstand.

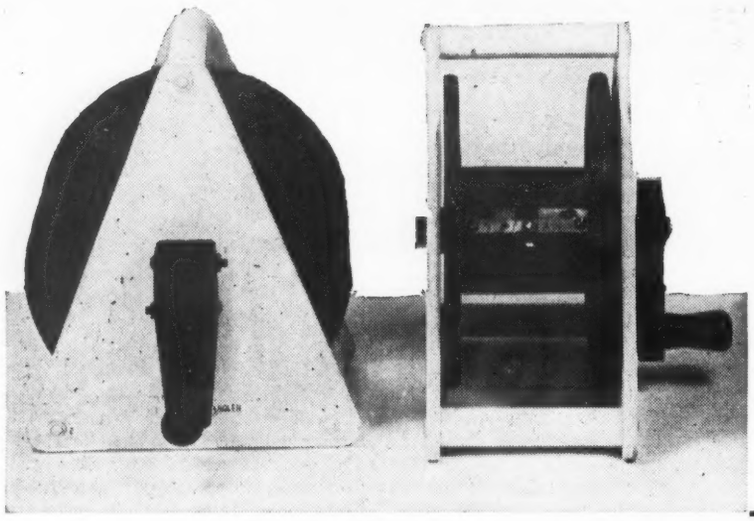
•

Grinding Shield

A new model of Marvel grinding shield with a completely redesigned frame molded from a high-impact-resisting plastic material—electrical parts in a completely insulated chamber and mounted on an adjustable bracket—and said to provide properly directed light and protection for the face and eyes from flying particles is offered

"Enginettes" Design Preparation Equipment

About 25 college girls were recruited by the McNally-Pittsburg Mfg. Corp., Pittsburg, Kan., in October, 1942, and trained on a 48-hour-week basis in the fundamentals of mathematics, trigonometry and mechanical drawing. Most of them had previously had only one year of mathematics and in nearly all cases no mechanical drawing at all. One of the McNally engineers, Elmer Sutterfield, was the instructor. After the intensive training course of about three months the girls were transferred to the engineering department, where they began work on structural-steel details of coal preparation equipment. Ever since they have been progressing nicely and two or three of them are making some of the engineers look to their laurels. The names of these female engineers, who are known as "enginettes," are: Margaret Douglas, Nellie Brock, Esther Packard, Marjorie Culbertson, Helen Hammerton, Helen Schasteen, Irene McQueen, Flodora Myers, May Mitchell, Bessie Boice, Golda Hull, Margaret DeFord and Rosemary Cowan.



Roxbury Safety Shot – Firing Cable Reel

This shot-firing reel will eliminate a lot of accidents because it is impossible to shoot with 20 to 25 ft. of cable, as the entire length of cable must be unwound from the reel to get at firing pins. These firing pins are located in a groove in the hub of the reel, and the cable wound around the hub. To shoot, a miner will have to unwind his reel and will naturally walk away from the face to do this.

After the cable has been unwound from the reel you are still short circuited until the battery is put on the firing pins and the face of the battery presses down a flexible spring which opens the circuit between the two firing points.

This reel is especially suitable for conveyor crews and mobile loaders, where a number of men are working together, and there is danger of accidents in shooting. Use of Reel also greatly lengthens the life of the shot-firing cable.

Price of Reel - $4.50 for 125 Feet of Cable

ROXBURY MACHINE SHOP, INC.

1311 Franklin St. Johnstown, Pa.

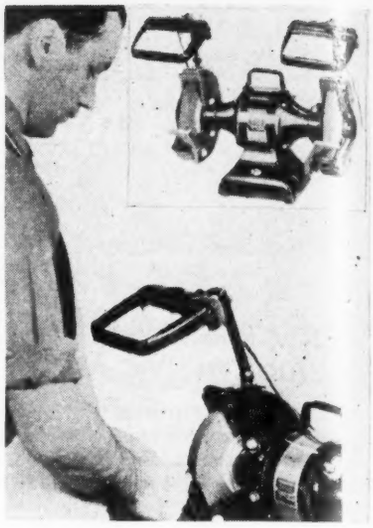
In order to attain the highest degree of accuracy in large, high-speed helical gears, the De Laval Steam Turbine Company has, from the very beginning, found it desirable to design and build its own gear generating machines.

The Master lead screw of the gear generating machine—a part vital to precision—is cut in the De Laval shops on a lathe of special design, built for the express purpose of producing lead of refinement necessary for precision gear generation.

M-35

De Laval STEAM TURBINE CO. TRENTON 2, N.J.

MANUFACTURERS OF TURBINES ... STEAM, HYDRAULIC; PUMPS ... CENTRIFUGAL, CLOGLESS, ROTARY DISPLACEMENT, MOTOR-MOUNTED, MIXED-FLOW, PROPELLER; PRIMING SYSTEMS; CENTRIFUGAL BLOWERS and COMPRESSORS; GEARS ... WORM, HELICAL, and FLEXIBLE COUPLINGS



by the Boyer-Campbell Co., Detroit, Mich. Light (pushbutton switch) is focused right on the work; the better visibility not only accounts for more rapid and accurate work but tends to avoid injury to the hands. The window is of non-shatterable glass and the lamps, of the bayonet type, are vibration-resisting and are set in flush with the frame.

•

Fuse Pullers

Ideal Commutator Dresser Co., Sycamore, Ill., offers Ideal "Safe-T-Grip" fuse pullers having notched edges on both sides specially designed to fit the fingers which are said to provide an easy, firm hold in addition to the frictional grip offered by the natural non-slip surface of the fiber material, which is completely insulated. These pullers are made in four sizes—"Midget," "Pocket," "Giant" and "Jumbo."

•

Hardening Solution

Steeltem Chemical Co., New York City, offers Steel-Temp, a hardening solution that is said to make heat-treating high-speed steel tools easier; simply heat and quench in Steel-Temp, without drawing or tempering. It also is recommended where the maker specifies oil-quenching treatment. A special-formula chemical solution, it is designed to work well with either water- or oil-quenching steels.

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Payroll Calculator

Overtime, as well as straight-time payroll calculations, can be figured in a jiffy, it is said, with a new and improved model payroll calculator now being manufactured by the Berger-Brickner Co., Los Angeles, Calif. Forty hours plus overtime are calculated in one operation on one side of the device for firms that require total pay check only. The reverse side is used for figuring straight time and overtime as separate items.

All hourly rates of pay from $0.40 to

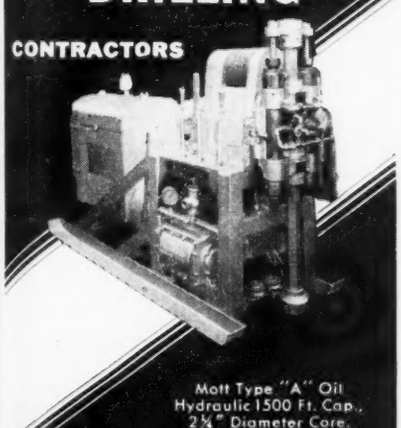
BUILDERS
Toledo Chronoflo

CONVEYOR
WEIGH METERS

Dependable equipment for *accurately* weighing and/or blending coal *while in transit* on conveyor belts. Write to Builders-Providence, Inc. (Division of Builders Iron Foundry), 9 Codding St., Providence, 1, R. I., for Bulletin 322.

Sincerely Yours,
BUILDERS — PROVIDENCE

MOTT
DIAMOND CORE
DRILLING
CONTRACTORS



Mott Type "A" Oil Hydraulic 1500 Ft. Cap., 2¼" Diameter Core.

● Coal and all mineral properties tested—using our light gasoline drills. They save fuel and moving costs . . . guarantee satisfactory and proper cores.

Pre-pressure grouting for mine shafts. ground solidification for wet mine areas by our stop grout method. Water wells and discharge holes drilled and grouted . . . electric drills for inside mine drilling.

MOTT CORE DRILLING CO.
HUNTINGTON • WEST VIRGINIA

$1.74 with ¼c. spread between rates; and time periods up to 80 hours with divisions of tenths and quarters of an hour are covered by the new model calculator. The computer is made of tempered masonite and lacquered wood.

•

Silver Babbitt

Creation of silver babbitt, a direct outgrowth of the shortage of tin, due to the war, is credited to exhaustive research by the Battelle Memorial Institute, Columbus, Ohio, to find a babbitt metal that is comparable to tin-base babbitts. The ideal was to create a babbitt that would have the same bondability and corrosion resistance as that of tin-base babbitts and which would retain its hardness at operating temperatures without squeezing out. The answer was found in silver alloyed with a properly balanced lead-base babbitt.

This new silver-babbitt metal is now produced by National Bearing Metals Corp., St. Louis, Mo., with the authorization of the Battelle Institute. Engineering briefs and a bulletin prepared by this company are obtainable by writing its department N-7.

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Industrial Notes

PORTABLE LAMP AND EQUIPMENT CO., Pittsburgh, Pa., has appointed Noble D. House as district manager for Kentucky, Tennessee, Illinois and Indiana with headquarters at Harlan, Ky. After leaving Illinois University he was affiliated with the Cardox Corp. and the Raleigh Wyoming Mining Co. Prior to his association with Portable Lamp & Equipment Co. he was general sales manager and eastern distributor for the Gibraltar Equipment & Mfg. Co.

LINK-BELT CO.'s Caldwell plant, in Chicago, was awarded the Army-Navy "E" for excellence in production of vital war material Oct. 17, making it the fourth of the company's plants to be thus honored.

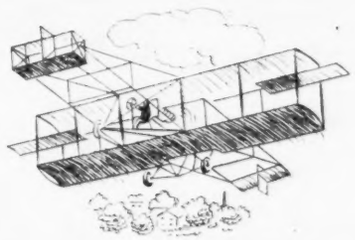
A. LESCHEN & SONS ROPE CO., St. Louis, Mo., has appointed R. P. Tyler as general manager of sales and C. R. Deam as assistant manager of sales.

JENKINS BROS., valve manufacturer, New York City, has appointed Alfred M. Street as publicity manager, in which capacity he will direct the advertising of all the company's products. He succeeds Charles G. Chamberlain, who has been made general sales manager.

JOHN R. CASSELL CO., INC., New York City, dealer in drafting supplies and technical reproduction processes and materials, has established a new industrial photographic materials department.

AHLBERG BEARING CO., Chicago, has brought McGregor in from branch manager's post at Cincinnati to take charge of replacement sales at the factory. He has been with the company since 1925.

TIMKEN ROLLER BEARING CO., Canton, Ohio, has appointed Whitley B. Moore as



"..we are sending you 500 of these new bombers for use in New Guinea.."

Our fliers couldn't win the war in planes like this. Inefficient old-time equipment has no place on battle-fronts or in breakers. Wilmot "Hydrotator" Preparation Units prepare Anthracite coal better and faster than any other method.—Wilmot Engineering Company, Hazleton, Pa.

WILMOT
A GREAT NAME IN THE COAL INDUSTRY
HYDROTATOR
COAL Preparation UNITS

MARKETS are increasing for STOKER COAL Eagle

STOKER COAL CRUSHER

● Will prepare you to supply the fast-moving stoker sizes—install one or more of these small crushers depending on your demand. Capacity 18-25 tons per hour—rolls adjustable for crushing to ¾" or ⅜"—5 h.p. to operate—rugged construction — low upkeep — prompt delivery — cost only $250. Write for more complete information.

Eagle IRON WORKS
DES MOINES, IOWA
Established 1872

director of sales for all divisions of the company. He is to be succeeded as general manager of sales of the Timken Steel and Tube Division by C. H. McCollam. Mr. Moore joined the company immediately after World War I. Mr. McCollam became associated with Timken in 1918.

B. F. Goodrich Co., Akron, Ohio, has named E. F. Tomlinson to be general manager of its industrial products sales division. He has been with the company since 1927 in various sales capacities, including field responsibilities in Chicago, Milwaukee and Akron, where he was manager of farm service tire sales. At the time of his appointment as division head he was engaged in war activities in the sales and service division.

Worthington Pump & Machinery Corp., Harrison, N. J., has added Harry A. Erb to its organization as service manager of its Moore Steam Turbine Division, Wellsville, N. Y. A 1928 graduate of Cornell University, his experience covers the servicing of steam turbines, electric generators and related equipment.

American Hoist & Derrick Co., St. Paul, Minn., has appointed R. H. McCormick as advertising manager. Previously he was advertising manager for the Vascoloy-Ramet Corp., North Chicago, Ill.

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has appointed Peter L. Lenz as manager of its Middle Atlantic district manufacturing and repair department. Formerly manager of the Homewood manufacturing and repair plant, Pittsburgh, Mr. Lenz will make his headquarters in Philadelphia. His new duties will include general supervision of two plants in Philadelphia, and one each in Wilkes-Barre, Pa.; Huntington, W. Va., and Baltimore, Md. He joined Westinghouse in 1925 as an engineer in the small motor division and has been with the company since. Nine Westinghouse plants have been honored with renewals of their Army-Navy "E" awards, eight now being permitted to fly the "E" burgee with two white stars. The Westinghouse Electric Elevator Co. plant in Jersey City, N. J., will fly an "E" burgee with four stars, marking the fourth renewal of its production award. The other plants honored are at East Pittsburgh, Trafford, Derry and Nuttall, Pa.; the transformer division, Sharon, Pa.; the steam division, South Philadelphia, Pa.; the Philadelphia manufacturing and repair plant, and the Newark (N. J.) manufacturing and repair plant.

Gardner-Denver Co. has appointed R. H. Rodolf as manager of its pump and compressor division, Quincy, Ill., vice R. J. MacFarland, deceased. Mr. Rodolf's connection with the company dates to 1917. C. M. George, who joined the company in 1929, has been named as Mr. Rodolf's assistant.

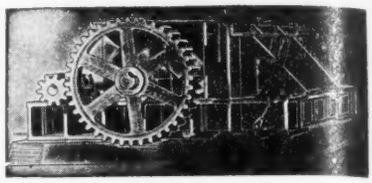
Thomas Laughlin Co., Portland, Me., manufacturer of wire rope and chain fittings for the Navy and Merchant Marine, has been awarded the pennant with one star which soon will be flying above its Army-Navy "E" award.

COFFING HOISTS ARE WORKING FOR UNCLE SAM

If your supply house cannot furnish you with Coffing Hoists *when* you want them you may be sure that Uncle Sam's orders are being filled first because we are certain he is placing them where they will do the most good. Coffing Hoists are also helping skilled labor to do the job better and faster on our production front.

COFFING HOIST CO.
Manufacturers of
Ratchet Lever, Spur Geared, Electric and Differential Hoists
Trolleys Utility Maintenance Tools
DANVILLE, ILLINOIS

A NEW VERSION OF AN OLD TYPE



"PENNSYLVANIA" TYPE "K" SINGLE ROLL COAL CRUSHER

With this advanced design, in rugged STEELBUILT construction, far more accurate sizing is possible to meet Code requirements through quick adjustability, in a range from ¾" to 8".

Further—real protection is provided by improved Safety Toggle Equipment, which quickly passes Tramp Iron, and instantly returns Breakerplate to crushing position.

Seven (7) sizes afford a capacity range from 50 to 1000 tons per hour.

Send for Bulletin No. 2006.

Also,— "PENNSYLVANIA" BRADFORD BREAKERS, BRADMILLS, GRANULATORS, HAMMERMILLS

PUT YOUR COAL PREPARATION PROBLEMS UP TO US.

PENNSYLVANIA CRUSHER COMPANY

Liberty Trust Bldg. Philadelphia
Representatives in Principal Centers.

HERCULES AUGERS

Hercules Augers

Ideal for modern high speed electric drills—withstands whips and torsional strains. Flint hard and tough as whalebone. Drills faster—drills more holes with resharpening—outlasts four to five ordinary drills. Recommended for the hardest jobs. Up to 3" diameters—up to 16 ft. in length.

Black Diamond Augers

Carefully made from high-carbon crucible grade steel—heat-treated to obtain as much hardness and toughness as possible, to prevent broken tangs and points. Furnished up to 2" diameters—maximum over-all lengths 16 ft.

Standard Augers

Originally developed for use with hand drills. These augers work best at hand drilling drilling holes under stumps, and ditch blasting. Up to 2" diameters from oval steel, 7/16" thick, and maximum length of ten ft.

Call on us for any type auger you may require in your operations. We specialize in manufacturing the better grade alloy, heat-treated augers. Write, wire or 'phone for details concerning sizes, prices, deliveries, etc.

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SALEM OHIO

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2849 N. Clark St., Dept. JK-11, Chicago 14, Ill.

Fight WITH WAR BONDS

Burrell Technical Supply Co., Pittsburgh, Pa., dealer in and manufacturer of scientific laboratory apparatus and reagent chemicals, has elected the following officers: G. A. Burrell, president; G. H. Burrell, vice president and general manager; C. S. Steenson, secretary and treasurer. E. Dollhopf has been named manager of purchases and R. M. Arnold, manager of sales.

Metal & Thermit Corp., New York City, has appointed Owen L. Holland as district manager, welding division, for the Chicago territory. He was at one time general manager of the Koro Corp., electrode manufacturer, and later general sales manager of the Hollup Corp., manufacturer of welding electrodes and accessories. He left the Hollup Corp. to establish his own business, handling welding specialties. Subsequently he was called to Washington as chief of the Welding, Electro-Plating and Equipment branch of WPB.

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Homer Littlefield Dies

Homer Littlefield, 66, manager, mining department, Marion Steam Shovel Co., died suddenly Oct. 17 at his home in Columbus, Ohio. His first employment after graduation from Massachusetts Institute of Technology was in the testing department of General Electric Co. He later joined the commercial division of the power and mining department. In 1924 he joined the Marion Steam Shovel Co. as manager of the mining division, which position he held at his death.

Mike O'Toole Passes

M. P. ("Mike") O'Toole, 47, district sales manager for the Ohio Brass Co. in the anthracite field of Pennsylvania, died Sept. 27 of a heart attack in Philadelphia. He had been in ill health for the last year and only recently returned to his territory. He had been associated with Ohio Brass since 1922 and had been a member of the sales organization since 1927.

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Trade Literature

Air Compressors—Schramm, Inc., West Chester, Pa. Bulletin Form A.E.D. 43 describes stationary and portable air compressors—skid-mounted and wheel-mounted.

Belt Conveyor Equipment—Webster Mfg., Inc., Tiffin, Ohio. Catalog 60-B covers specialized data on the application of belt conveyors for handling materials, together with the listing of belt-conveyor equipment. Included are charts and tables to assist in the selection of proper conveyor units and equipment for any specific service and location requirement.

Care of Buckets—Hayward Co., New York City. Three booklets cover the care of orange-peel, clamshell and electric motor buckets, stressing the importance of correct bucket lubrication at proper intervals, frequent inspection of wearing surfaces and parts, the advantage of promptly replacing worn parts before they weaken or impair the whole bucket structure, and the greater operating efficiency obtained by keeping moving parts in proper adjustment.

Electric Car Spotters—Link-Belt Co., Chicago. Book 1992, on self-contained electric car spotters, covers vertical-capstan units of 5,000 and 10,000 lb. starting pull capacity, for mounting on a stationary foundation or equipped with portable frame for convenient transfer from one location to another. The electric motor can be integrally mounted on car spotter or connected by flexible coupling and compactly mounted on a welded-steel base common to motor and spotter. Horizontal-drum type car pullers for heavy-duty service, and special capstans and anchor windlasses for marine service also are shown.

Horizontal Centrifugal Pumps—La-Bour Co., Inc., Elkhart, Ind. Bulletin 50 is a concise presentation of important facts concerning what is said to be a basic advancement in the pumping art, with a comprehensive description and explanation of the resulting equipment and its many applications.

Industrial Greases—Sun Oil Co., Philadelphia, Pa. Booklet entitled "What Makes a Grease" briefly discusses the standards by which a good grease should be judged, pointing out the various factors which should influence selection of the proper grease for a specific job. It describes the outstanding characteristics of the various Sun greases that have been developed for different uses.

VICTORY

will NOT be won by accident

It has been conservatively estimated that total time lost this year through common accidents will amount to the equivalent of a complete shut down of every plant and every mine in this United States for one solid week!

Vitally concerned with accident prevention measures is Bituminous Casualty Corporation to which the major coal fields in 21 states look for protection and a Mine Safety and Inspection Service unequalled anywhere in the country. But the best efforts of safety engineers, however experienced, are not enough. Their success depends very greatly upon the sustained cooperation of management and miners alike.

VICTORY will not be won by accident but by PRODUCTION, greatly increased by the alert application of every device known for the prevention of accidents and the active collaboration of everyone concerned.

BITUMINOUS CASUALTY CORPORATION

ROCK ISLAND ILLINOIS

LUMBER DESIGN SPECIFICATIONS—National Lumber Manufacturers Association, Washington 6, D. C. Leaflet entitled "Notice to Owners of Copies of W.S.D.D." tells how to use "Wood Structural Design Data" series of publications issued by the association to simplify the application of engineering design of the "National Emergency Specifications for the Design, Fabrication and Erection of Stress Grade Lumber and Its Fastenings for Buildings—Directive 29," made mandatory by the War Production Board on and after Nov. 1, 1943.

MANGANESE STEEL — American Manganese Steel Division, American Brake Shoe Co., Chicago Heights, Ill. Bulletin 743-M, covering manganese steel and its relationship to the mining and quarrying industries, supports the thesis that production and handling equipment will produce more continuously and last longer when equipped with wearing parts made of this abrasion- and stress-resisting steel. Describing the origin of manganese steel and the properties which give it exceptional toughness and wear resistance, the book deals extensively with wearing parts for equipment used in mines, quarries and sand pits, such as power shovel dippers, dipper teeth, apron feeders, pumps, screens, wheels, sheaves, chains and the like. Considerable space is given to the crushing processes in mines and quarries and the performance of manganese steel parts for gyratory, jaw, roll and hammer crushers and fine grinding mills.

MATERIALS HANDLING MACHINERY—Robins Conveyors, Inc., Passaic, N. J. Bulletin 125 lists and pictures a wide variety of equipment for handling bulk materials with facility, efficiency and economy.

PIPE AND TUBE BENDING—Copper & Brass Research Association, New York City. Treatise shows methods and devices for bending pipes and tubes of copper and its alloys. It gives unit weights of tubes of different alloys with varying diameters, wall thickness and shape, as well as pertinent information on the chemical and physical properties of such pipe material. Also covered in the book are hot and cold bending, minimum radiuses, temper, the use of mandrels of various types and many other essential factors. Bending with the use of filler materials such as sand, rosin, salt and low-melting temperature alloys are described and illustrated. Step-by-step procedures for both smooth and wrinkle bending of large-diameter pipe show methods and equipment in considerable detail.

PIPE TOOLS—Beaver Pipe Tools, Inc., Warren, Ohio. Catalog 44 gives broad coverage to the Beaver line, clearly dissecting Beaver tools and machines for the benefit of the buyer. A condensed catalog, used freely by jobbers' salesmen in loose-leaf books and by jobbers in passing out to the interested trade, also is fresh from the press.

PREVENTING WELDING AND CUTTING FIRES—International Acetylene Association, New York City. Booklet contains brief, clear discussion for users of welding and cutting equipment of the chief causes of fires and practical, common-sense measures for preventing them.

PRODUCTION MANAGEMENT — Bedaux Co., Inc., New York City. Booklet outlines methods of improving utilization of manpower resources and plant facilities through cooperation between management and labor. Sections are devoted to work measurement and production control, method improvement, labor cost and expense control, supervision and indirect labor, planning and scheduling, job evaluation, incentive wage plans, and other phases of plant operation. The elements of a correct incentive wage plan are outlined in detail, the importance of getting the workers' cooperation being strongly emphasized.

WOOD PRESERVING—Koppers Co., Pittsburgh, Pa. Book details uses of pressure-treated lumber in the mining field. A special section, "Economical and Permanent Construction With Pressure-Treated Wood," explains the several processes by which lumber is treated to protect it against decay, marine borers, acids, termites and fire. Pictured are a number of typical mining installations, including Ar-Moored ties, mine-car bottoms, preframed shaft timbers and trolley poles. A reference table of recommended uses of pressure-treated lumber in mining and other fields is included.

WRENCHES—Blackhawk Mfg. Co., Milwaukee 1, Wis.—Catalog 243, designed to be of assistance beyond the mere listing of items, covers a complete basic range in socket, box-type and open-end wrenches. Included are a "Dictionary of Popular Wrench Terms" and a section illustrating how proper selection of wrenches brings extra speed, safety and utility to the job.

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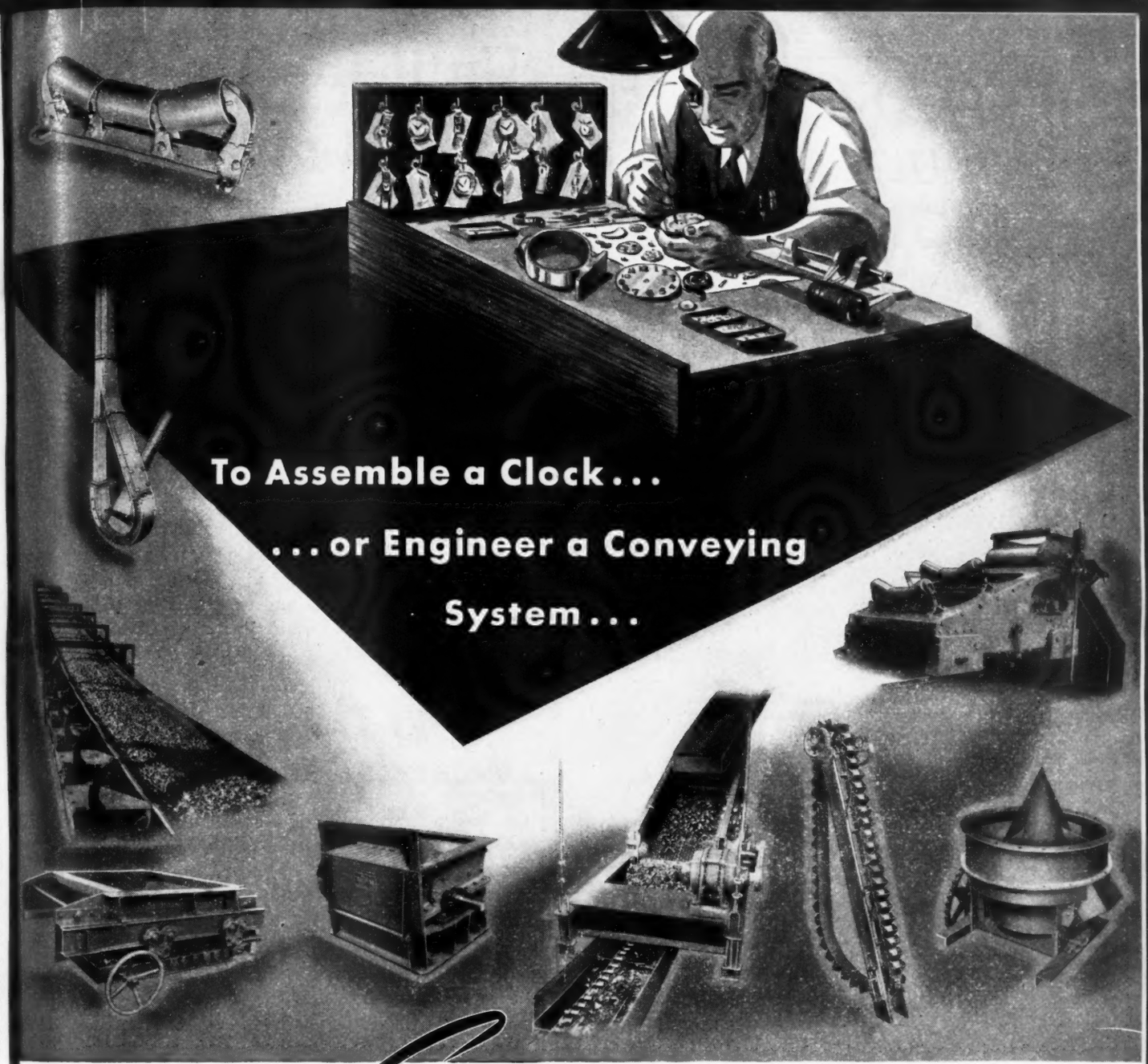

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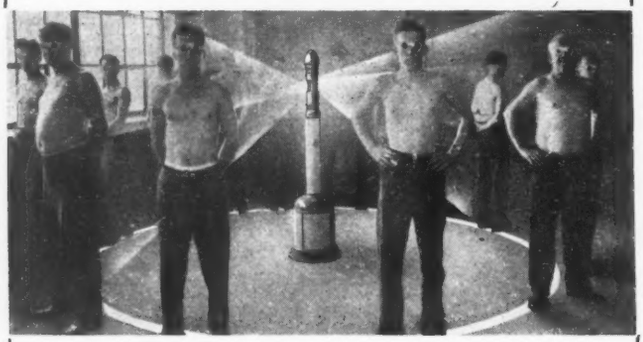

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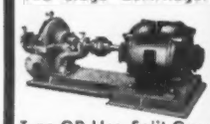

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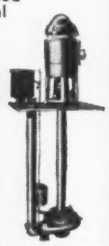

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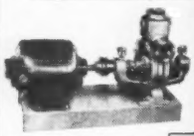

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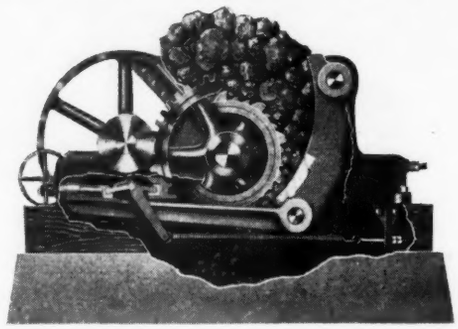

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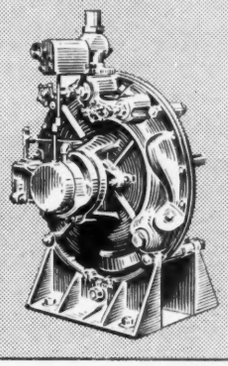

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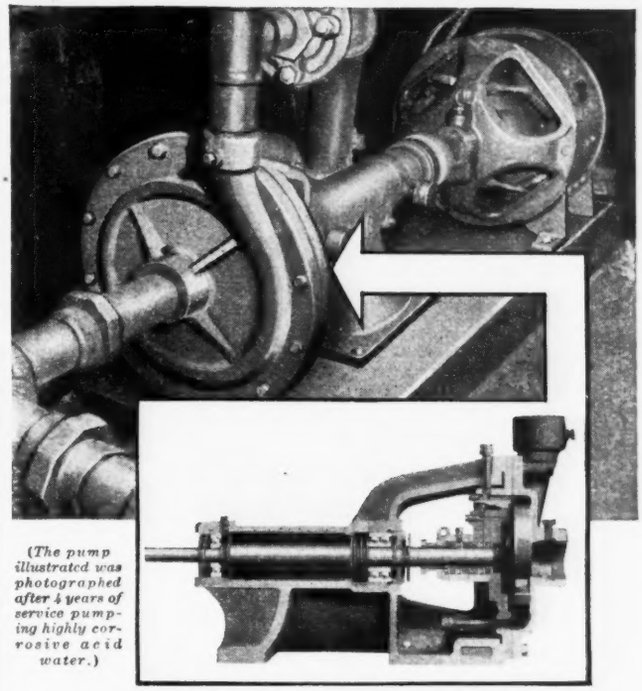

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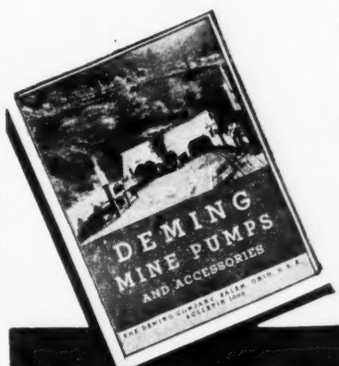

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DIAMOND CORE DRILLING, for any mineral. More than sixty gasoline, steam and electric drills, suitable for any job. OUR SPECIALTY—testing bituminous coal lands. Satisfactory cores guaranteed. Prices very reasonable.
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WANTED
Shovels—¾ to 2½ yards.
Draglines—1½ to 6 yards.
FRANK SWABB EQUIPMENT COMPANY
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Telephone 3906

WANTED
50 cars not over 26" high—42 " gauge.
For low vein coal.
Write
MASON & SONS COAL CO.
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Large Quantity
300,000 CM Bare Cable
250,000 CM Bare Cable
No. 4 Bare Hard Drawn Wire
Also various other sizes in lessor quantities. Long lengths. Excellent condition. Immediate delivery.
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WANTED
Double-Ended Lathe suitable for turning Mine Locomotive wheels from 18" to 36" diameter on thread. State make, condition and price.
200-ton Hydraulic Wheel Press suitable for pressing—off Mine Locomotive wheels. State make, condition and price.
W-232 Coal Age
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Wanted Joy Mine Loaders
Size 5 BU—7 BU—8 BU—12 BU—14 BU. With AC motors, caterpillar mounted and car wheels adjustable 36" to 42" gauge. 150 KW motor generator set.
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Conveyor Belting...Transmission Belting...Elevator Belting...Fire, Water, Air, Steam, Suction or Welding Hose, etc.

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ABRASIVE RESISTANT COVERS

Width	Ply	Top-Bottom	Covers
48"	8	1/8"	1/16"
42"	5	1/8"	1/16"
36"	6	1/8"	1/16"
30"	6	1/8"	1/16"
30"	5	1/8"	1/16"
24"	5	1/8"	1/32"
24"	4	1/8"	1/32"
20"	5	1/8"	1/32"
20"	4	1/8"	1/32"
18"	4	1/8"	1/32"
16"	4	1/8"	1/32"
14"	4	1/16"	1/32"
12"	4	1/16"	1/32"

Inquire For Prices - Mention Size and Lengths

TRANSMISSION BELTING

HEAVY-DUTY FRICTION SURFACE

Width	Ply	Width	Ply	Width	Ply
18"	6	10"	6	6"	5
16"	6	10"	5	5"	5
14"	6	8"	6	4"	5
12"	6	8"	5	4"	4
12"	5	6"	6	3"	4

Inquire For Prices - Mention Size and Lengths

ENDLESS "V" BELTS

"A" WIDTH All Sizes | "D" WIDTH All Sizes
"B" WIDTH All Sizes | "E" WIDTH All Sizes
"C" WIDTH All Sizes | Sold in Matched Sets

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FIRE HOSE

APPROVED SPECIFICATION HOSE
EACH LENGTH WITH COUPLINGS ATTACHED

Size	Length	Per Length
2½"	50 feet	$28.00
	25 "	16.00
2"	50 "	23.00
	25 "	13.00
1½"	50 "	20.00
	25 "	11.00

Specify Thread On Couplings

SPECIAL OFFER . . . HEAVY DUTY
RUBBER HOSE

WATER HOSE
Each Length with Couplings Attached

I.D. Size	Length	Per Length
¾"	25 feet	$4.25
1"	50 "	8.00
	25 "	6.25
1¼"	50 "	12.00
	25 "	7.50
	35 "	10.50
	40 "	12.00
1½"	50 "	15.00
	25 "	10.00
	35 "	14.00
	50 "	20.00

AIR HOSE

I.D. Size	Length	per Length	Couplings
½"	25 feet	$5.00	$1.50 Pair
	50 "	10.00	1.50 "
¾"	25 "	6.25	2.50 "
	50 "	12.50	2.50 "
1"	25 "	10.00	3.50 "
	50 "	20.00	3.50 "

LARGER SIZES ALSO AVAILABLE
All Prices—Net—F.O.B. New York

CARLYLE RUBBER CO., INC.
62-66 PARK PLACE — NEW YORK, N. Y.

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6 YD. or 8 YD. STRIPPER SHOVEL
225B Bucyrus 80 ft. Boom, 54 ft. Dipper Stick, Steam Shovel.

2-4 Yds. SHOVELS
2 Marion Model, 125, Electric, 35' Boom, 25' Dipper Sticks

DIESEL DRAGLINE
2—52B 2½ Yd. Cap. 80 ft. Boom Diesel Caterpillar Draglines.
3 Yd. P.&H. 800, 97' boom.
2½ Yd. 48B Bucyrus 80' boom.
2—2½ Marion Electric Shovels.
75—1½ & 2 Yd. Dump Cars.

AIR COMPRESSORS:
(7) Steam 66 ft., 300 ft., 600, 1000 & 1940 ft. (12") Belted, 360, 676, 870, 10000, 1300 ft.
(12) Diesel 105, 315, 520, 676 & 1000 ft.
(6) Electric, 1300, 1500, 2200, 2600, 5000 ft.
(14) Gasoline, 110, 160, 220, 310 & 370 ft.

COAL CRUSHERS:
Jeffrey Single Roll 18x18, 24x24 & 30x30
Link Belt 26x24 Double Roll Crusher

HYDRAULIC CARWHEEL PRESSES:
100 Ton, 150 Ton, 300 Ton, 300 & 400 Ton Caldwell - Niles - Wood - Watson Stillman

RUBBER CONVEYOR BELTS:
1000' 60", 600' 30", 300' 20", 1600' 42", 900' 48", 1450' 36", 1200' 24", 900' 18", 600' 16", 350' 14".

TANKS:
12,000 and 15,000 gal. and 20,000 gal.

CONVEYOR PARTS:
Idlers, Heads & Tail Pulleys, Steel Frames, Tripper, etc., 14 In., 60 In. Large stock here.

SYNC. MOTOR GENERATORS & ROTARYS:
100 KW Ridgway 1200 RPM 3/60/2300/250-275
150 KW G.E. 1200 RPM 3/60/2200-250-275
200 KW Ridgway 900 RPM 3/60/2200-250-275
3—100 KW G.E. 275 v. 1200 RPM Rotarys

STORAGE BATTERY LOCOMOTIVES:
2½ ton Witcomb 24 ga. New Batteries
2—4 ton G.E. 30 in. ga.
3—5 ton Mancha 30 in. ga.
4—5 ton G.E. 36 in. ga.
3—7 ton Goodman 36 ga. Battery & Trolley
8—6 ton Baldwin Westgh. 42 ga. & 36 ga.

TROLLEY LOCOMOTIVES:
2½ ton Westinghouse 24 ga.
4—6 ton & 3—5 ton Goodman, 36 ga.
3—6 ton Goodman 30 ga.
4—6 ton Goodman 42 ga.
5—6 ton Westinghouse 42 ga.
2—8 ton Goodman 36 ga.
10 ton Goodman 42 ga. & 13 ton Jeffrey

VIBRATING SCREENS:
9 Tyler Hummer 3x6, 4x5, 4x8 & 4x10
2 Robins Gyrex 4x8½
4x12 Niagara, 3x8 L. B., 5x6 Simplex

CARS:
60—Western 16-20-30 yd. Side Dump

SHOVELS, CRANES & DRAGLINES:
3 W 90' Boom, 6 & 160' Boom, Model 6150, 175' Boom, Diesel, Monighan Walkers
1 yd. K 30 Link Belt 50' Boom Crane
2 yd. Page 70' Boom Diesel Dragline
1¼ yd. Marion 450 Elec. Shovel
1½ yd. Lima Diesel Shovel & Dragline
2 yd. Link Belt Elec. Shovel & Dragline
25 ton Browning 50' Boom Loco. Crane

MINE LOADERS:
Junior Joy 36 ga. Low Pan
Conway 20 Mucker
3—5 BU & 7 BU 36 or 42 ga. Joy
9—Goodman 200 & Jeffrey 441
7 Conway 20A, 30A, 50A, 60 & 75 Muckers

MISCELLANEOUS:
15 Ton Plymouth 36 ga. Diesel Locomotive
5'x160' Traylor Rotary Dryer
6—Goodman 12CA & 12DA 6 ft. Cutters
9x8 Sullivan Mine Compressors
Clamshell Buckets ¾, 1, 1½ & 2 yd. Cap.
80 ton & 12 ton Vulcan Std. Ga. Gas. Loco.

WANTED TO BUY:
Complete Mines—M.G. Sets, Locomotives, Compressors, Conveyors, Cranes, Crushers & Rotary Converters. Also Rails, Screens, Pumps, Cars, Mine Loaders & Mining Machines.

R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y.

★ MINING EQUIPMENT READY FOR DELIVERY ★

CUTTING MACHINES—250 Volt
1—12-AA Goodman Shortwall, 50-HP.
1—12-EJ Goodman Shortwall, 50-HP.
1—112-AA Goodman Universal, 50-HP.
1—12-A Goodman Shortwall, 35-HP.
1—28-A Jeffrey Shortwall, 30-HP.
1—29-B Jeffrey Arcwall
1—29-B Jeffrey Arcwall with 29-C motor
2—CE-7 Sullivan Shortwall
220-440 Volt A. C. Motors for Goodman Standard and Low Vein machines

LOCOMOTIVES—250 Volt
1—10-Ton Jeffrey 42 or 44" Gage, 3" armor plate frame. New throughout except units.
1—6-Ton Ironton, low vein with cable reel, 44" Ga.
1—4-Ton G.E. low vein, 44" ga. with cable reel.
1—13-Ton Westinghouse, 48" Ga.

MOTOR-GENERATOR SETS
1—200-KW. Westinghouse, 2200 volt Sync. motor, 250 volt Generator, Comp. with switchboards.
1—75-KW. Westinghouse, 2200 volt Sync. motor, 250 volt generator, Comp. with switchboards.
1—150-KW. Jeffrey generator only, 250 volt.

MISCELLANEOUS
1—5' x 8' Fairmont Vibrating Screen.
1—Fig. 8 Incline rope drum.
1—24 x 24" Jeffrey single roll crusher.
2—Cameron Centrifugal pumps, 650 GPM. 70' head.
1—Deming Centrifugal pump, 400 GPM. 70' head.
1—100-HP. Natural gas engine with 220 volt, A. C. Generator and switchboard.

ALL-STATE EQUIPMENT CO., INC.
LOGAN, W. Va. PHONE 884

REBUILT - GUARANTEED
1—200 KW, G.E. Rotary Converter
3—55 KVA, G.E. Rotary Transformers
3—165 KVA, G.E. Rotary Transformers
A.C. & D.C. Rotary Control Panels
3—Oxide Film G.E. Lightning Arrestors
Oil & Air Circuit Breakers
1—1/R Portable Air Compressor
Motors: A.C. and D.C.
6—600 Ampere DB-257 Line Contactors
Power, Distribution & Current Transformers
150—5 Ampere, 110 Volt, 2 Wire Meters
3—S & C Oil Filled Fuses with Supports
1—24 Circuit Control Breaker Panel

R. H. BENNEY EQUIPMENT COMPANY
NORWOOD 10, OHIO

LOCOMOTIVES

Goodman: All 250 volts.
1—10 ton, 31-1-4-T.
1— 6 ton, 30B, 48" 1—5 ton.
1— 5 ton, W-1-2, 36".
1— 4 ton, 8-30.

Westinghouse: All 250 volt.
1—4 ton, 902, 48" 1—18 ton, 102, 42"
1—904 c. 44" 500 volt. Also 906 motors.
1—10 ton, 915.

G.E.: All 250 volt.
6 ton 803, 44", as is
6 ton 823, 44"
6 ton 801
8 ton 839
4 ton 1022, 41, as is
5 ton 825, 44"
8 ton 839 motors

Jeffrey: 6 ton, and 4 ton, all gauges, 250 volt
1—**Jeffrey** MH 110 Locomotives
1—**Jeffrey** MH 100

MINING MACHINES

Jeffrey, 35B, 29B, and 4—28A, 250 V. 2—29C with drop bar support.
Goodman, 12A, 12AB, 12AA, 12G3A, 34B.
1—12G3 250 volt and 2—112 DA, 500 volt.
2—Permissible Type 12CA. 6—112AA, 3—124AA.
Sullivan, CE7, CE9, CE10, CR10 Low Vein.

SUBSTATIONS—275 volts, D. C.

2—200 KW **GE Rotaries** (600 volt)
1—200 KW **Ridgeway** M.G. Set.
1—200 KW **G.E.** Rotary Converter.
1—200 KW **West.** Rotary.
1—150 KW **West.** Rotary.
1—200 KW, 1—100 K **Ridgeway** M-G Sets.
1—150 KW **Ridgeway** Rotary.
1—150 KW **West.** Rotary converter.
1—100 KW **West.** M-G Sets.
1— 90 KW **G.E.** Rotary.

SPARE ARMATURES

Jeffrey MH 110, MH 78, MH 73, MH 88, 29B, 35B and 28A. Goodman 34B, 30B, 30C, 12A, 12AB, 12AA, 33-1-4-T, 31-1-4-T. General Electric 801, 803, 819, 821, 825, 839. Westinghouse 904, 906, 102, 907, YR2, 115. Also 200 KW Westinghouse Rotary Converter Armature, 250 V. Bracket Type, 150 KW G. E. HCC Bracket Type, and 150 KW G. E. TC Pedestal Type.

AERIAL TRAMWAYS * HOISTS * PUMPS * MOTORS * TRANSFORMERS * BOND WELDERS * RESISTANCE * COMPRESSORS * DUMPS * SPEED REDUCERS FIELD FRAMES * ARMATURES * GOODMAN HYDRAULIC SHOVELS * MOTOR STARTERS AND CONTROLLERS—AC & DC * DROP BAR SUPPORTS (Gooseneck), 29B and 29C * MINING MACHINE TRUCKS * SWITCHBOARDS * CIRCUIT BREAKERS—AC & DC * CONVEYOR HOISTS * COAL CRUSHERS (double roll) 12"x16", single roll 24"x36", 36"x36" CONVEYOR HOISTS, 24"x24" and 18"x16" * TURBO-GENERATOR 500 K.W. 275 volt DC * ROPE & BUTTON CONVEYOR 400' long LATHES, SHAPERS * SWITCHES * AUTOMATIC CIRCUIT BREAKERS 250 volt 600 amps to 2000 amps * MANUAL CIRCUIT BREAKERS 600 amps to 3000 amps * HOISTS, overhead, AC, 3-60-440, 1 ton and 2 ton * CAR RETARDERS, Fairmont * 1 Clam shell bucket 1¾ cubic yard, 1—Figure 8 drum * MINE CARS Solid, 22" high with rotary dump, 44" gauge * 2 SULLIVAN BIT SHARPENERS * R.R. SWITCHES 85# to 100# HOISTS 5 HP AC and DC. GENERATORS DC 250-275 volt, 30 KW to 100 KW.

GUYAN MACHINERY COMPANY, Logan, W. Va.

CURRENT SPECIALS

Two—Ironton type WOD double motored 42" ga combination battery-trolley locomotives (without batteries), GE 80 volt ball bearing motors, worm & worm gear drive, ball bearing trucks. Good used condition. Price subject inspection and prior sale, $1125.00 each.

One—Mansha single motored 36" ga battery locomotives (without batteries). As is, subject inspection and prior sale, $600.00 each.

One—Sullivan C67 mining machine, 3-60-220 volt, tip turn truck, cable etc.—Subject inspection and prior sale, $1050.00.

One—100 KW Allis-Chalmers rotary converter, with three 40 KVA transformers, HV 6900 LV 185-92.5, As is, subject inspection and prior sale, $1350.00.

Two—562 KW Allis-Chalmers turbo-generators, 3 phase 60 cycle 2300 volt, complete with condensers, piping, valves, wiring and switchboards. Price, $10,000.00 per unit, subject inspection and prior sale.

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SPECIAL
KUHLMAN ELECTRIC FURNACE TRANSFORMER
1000 KVA, 3-phase, 60 cycle, 7200—124/72/55 Volts, available for immediate shipment

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"AMERICA'S USED TRANSFORMER CLEARING HOUSE"
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6,000 linear feet	56 lb. per yard
40,000 linear feet	70 lb. per yard
20,000 linear feet	80 lb. per yard
40,000 linear feet	85 lb. per yard
17,000 linear feet	90 lb. per yard
975 linear feet	100 lb. per yard

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ARE THE CARS YOU WANT LISTED HERE?

50—Hopper, Double, 50-Ton
45—Hopper, Side-Discharge, 50-Ton
30—Ballast, Composite, 50-Ton
50—Box, 36-ft., 40-Ton; Steel Ends
16—Refrigerator, 36-Ft., 30-Ton
50—Refrigerator, 40-ft., 40-Ton
75—Gondola, Composite, 36-Ft. & 40-Ft., 40-Ton
2—Dump, Western, Automatic, 20-Yd., 40-Ton
6—Dump, Magor, Automatic, 25-Yd., 50-Ton
8—Dump, Western, Automatic, 27-Yd., 40-Ton
10—Dump, Western, Automatic, 27-Yd., 50-Ton
10—Dump, Western, Automatic, 30-Yd., 50-Ton
10—Dump, Koppel, Side-Discharge, 24-Yd., 30-Ton
150—Tank, 8000-Gallon, 40 and 50-Ton

Locomotives and Passenger Cars too!

IRON & STEEL PRODUCTS, INC.

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"ANYTHING containing IRON or STEEL"

LOCOMOTIVES

1—American 41 ton, 4 wheel, saddle tank Locomotive, electric lights, steam brakes, ASME boiler, 190 lbs. Sale or rent.
1—Lima 80 ton, six wheel, Switcher with tender, National Board boiler, 200 lbs. working pressure, super heater, automatic lubrication; excellent condition, immediate delivery.
1—American 68 ton, 6 wheel, Switcher with tender, electric lights, air brakes, power reverse; overhauled.
1—Whitcomb 6 ton, 36" gauge, gasoline driven Locomotive, electric lights, starter, etc.

CARS

8—20 yd. capacity, K & J, all steel, air dump Cars, lift type doors, cast steel side truck frames, air brakes, air dump.

CRAWLER CRANE

1—General ¾ yd. crawler tread with ¾ yd. Blaw Knox clam shell bucket, powered with Buda diesel motor.

OVERHEAD CRANE

1—Shepard 7½ ton, 36 ft. span, 220 volt, D.C., bucket operating.

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Fairbanks Morse Railroad Track Scale
$5,500.00—Like new
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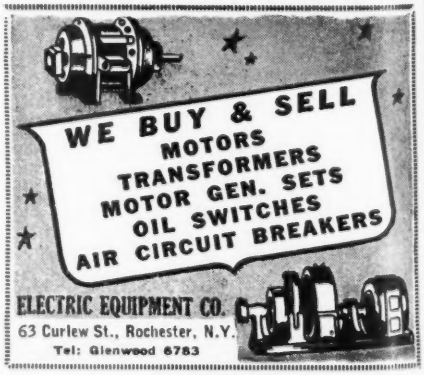

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MINING MACHINES—250 v. DC
1—CE-7 Sullivan 36" gauge
1—CE-9 Sullivan
2—7 A.U. Sullivan Track Mt'd. 550 v. DC
2—Sullivan 51B Buddy Mining Machines 230 v. DC 5' bar, 2½" kerf, with extra armature and parts

MINE LOCOMOTIVES
1—3½ ton Ironton Battery 36" ga.
1—6 ton Atlas 4000# D.B.P. with AC or DC Motors 36" ga.
1—10 ton Milwaukee Gasoline

ROTARY CONVERTERS
1—500 kw. G.E. type HC-28, 400 volt, 900 rpm. complete with transformers and switchboards
200 kw. G.E. 275 v. DC 900 rpm complete with transformers

HOISTS
100 HP. Lidgerwood 2 drum AC or DC Motor
1—Lidgerwood Single Drum, holds 9000 ft. 1" rope complete with 225 HP G.E. Motor

CENTRIFUGAL PUMPS
2—1000 G.P.M. Cameron bronze, 100' hd. 8 x 8
1—800 G.P.M. Weinman 90' hd. 6 x 5
2—160 G.P.M. Deming Triplex 150# 335' hd. 6 x 8
1—Sterling Portable Gasoline driven

DIESEL ENGINE SET
1—217 KVA G.E. 2300/220/440 v. 3 ph. 60 cy. rpm. dir. con. to 260 HP Buckeye horiz. 2 cyl. Diesel
1—100 KW West., 250 v. DC, 900 rpm., V-belted, 185 HP Venn Severin oil engine, 280 rpm., 3 cylinders, vertical, complete with air compressor, tanks, pumps, belts, etc.

TRANSFORMERS— 1 ph. 60 cy.

No.	Kva.	Pri.	Sec.	Make
1	250	2300	460	G.E.
1	100	2200	110/220	G.E.
3	100	6600	550/440/220	Pgh.
3	50	11430/6600	550	Al. Ch.
3	50	6600	575	G. E.
1	37½	2300	220/440	Wagner
3	37	4400	185	West.(Rotary)
1	30	2200	110/220	G. E.
2	30	440	220/110	West.
35	10	2200	110/220	G. E.
100	7½	2200	110/220	G. E.
75	5	2200	110/220	West.

SLIPRING MOTORS—3 ph. 60 cy.

HP	Make	Type	Volts	RPM
1500	Westg.	CW	2200	435
400	Westg.	CW	440/220	1170
300	Westg.	CW-1106	2200	580
300	W. El.	I-12	440/220	600
250	Westg.	CW	2200	345
100	G. E.	I	220	450
100	Westg.	CI	220/440	1750
75	Cr. Wh.		220/440	875
60	Triumph	C-16	220/440	430
60	Westg.	HF	2200	690
53	G. E.	I	220/550	1165

230 V. DC MOTORS

HP	Make	RPM	Type
20	Westg.	575	S
25	Triumph	1750	——
25	Dukane	1150	NS-205
25	G. E.	775	DLC-202
25	Western Elec.	730	ELC
25	Westg.	1300	S
30	Westg.	1150	SK-110L
30	Bullock	850	——
35	Westg.	575	S-10
35	Westg.	950	S
35	Westg.	675	SK-140
35	Westg.	675	SK
125	Morg. Gardner	425	——
150	G. E.	500	MPC-6
150	Cr. Wheeler	625	CCD
200	Cr. Wh.	477	CCD
250	Cr. Wheeler	200/400	CMC
300	Otis	550	——

(With spare armature)

SCALES

9—Howe No. 2784, 3 beams (2 at 200 lbs.—1 at 50 lbs.) Platform 14½ x 22", cap. 500#

DUQUESNE ELECTRIC & MFG. . . . . PITTSBURGH (6), PA.

MINE EQUIPMENT

100 Kw Gen. Elect. Rotary 250/2300 V
300 Kw Westghse. Rotary 600/2300 V
24"x20" Jeffrey 2 Roll Coke Crusher
18"x30" McLanahan Coal Crusher
50 Hp Lidgerwood Double Drum Hoist
50 Hp Ottumwa Single Drum Hoist
2750 GPM Synch. Mtr. Driven Pumps
600 GPM D.C. Mtr. Deep Well Pumps
350 Hp 3/60/2200 V Weco S.R. Motor
250 Hp 3/60/2200 V Weco S.R. Motor
200 Hp 3/60/2200 V Geco S.R. Motor
Large Stock—A.C. & D.C. Motors
Switchboards Built to Order

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IRON and STEEL PIPE

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Large stocks, all sizes
attractive prices

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P. O. Box 1647 Pittsburgh 30, Pa.

MINE HOISTS

1—Ottumwa 18" Band friction will coil 2000 ft. ¾" rope 35 or 50 HP motor.
1—Vulcan 30" Band friction will coil 3000 ¾" rope 50 or 60 HP motor.
1—Connellsville 54" Band friction will coil 5000 ft, ⅞" rope 100 or 150 HP motor.
1—Lidgerwood 60" Band friction will coil 6500 ft. 1⅛" rope with 200 to 350 HP motor.
1—Vulcan 60" Sliding pinion will coil 3500 ft. 1⅛" rope. 200 HP motor.
1—Lidgerwood-Cylindro Conical Shaft Hoist—225 ft. 1¼" rope. 300 HP motor.
1—Vulcan-Cylindro Conical Shaft Hoist 350' 1⅜" rope. 400 HP motor.
1—Connellsville-Cylindro Conical Shaft Hoist 350' 1½" rope. 800 HP motor.

And other hoists to suit all mining conditions

Jones Mining Equipment Co.
541 Wood Street Pittsburgh, Pa.

ROTARY CONVERTERS

500 KW G.E. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers.
500 KW AL-CH SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers.
500 KW WEST. SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers.
300 KW G.E. SYN. 575 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.
200 KW AL-CH SYN. 275 V. 6 Ph., 60 Cy., 1200 RPM, Pedestal Type, 2300/4000 V. Transformers.
150 KW G.E. SYN. 275 V. HCC, 6 Ph., 60 Cy., 1200 RPM, form P, 2300/4000 V. Transformers.

MOTOR GENERATORS

300 KW WEST. SYN. 275 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Manual Switchgear.
300 KW RIDGWAY SYN., 275 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Manual Switchgear.
200 KW G.E. IND., 600 V., 2300/4000 V., 3 Ph., 60 Cy., 1200 RPM, Manual Switchgear.
200 KW R.W. SYN., 275 V., 2300/4000 V., 3 Ph., 60 Cy., 900 RPM, 80% P.F. Manual Switchgear.
100 KW G.E. SYN., 275 V., 2300/4000 V. 3 Ph., 60 Cy., 1200 RPM, Manual Switchgear.

LOCOMOTIVES

13-T WESTGHE, 250 V., 908-C Mts., 36"-36" Ga.
10-T WESTGHE, 250 V., 907-C Mts., 36"-44" Ga.
10-T WESTGHE, 500 V., 907-C Mts., 36"-44" Ga.
8-T JEFFREY, 250 V., MH-85 Mts., 24"-36" Ga.
8-T WESTGHE, 250 V., 906-C Mts., 36"-44" Ga.
8-T WESTGHE, 500 V., 906-C Mts., 36"-44" Ga.
8-T GOODMAN, 250 V., 132-A Mts., 36"-44" Ga.
6-T WESTGHE, 250 V., 904-C Mts., 36"-44" Ga.
4-T WESTGHE, 250 V., 902-C Mts., 36" Ga.

Each unit listed above is owned by us and is available now for immediate purchase.

WALLACE E. KIRK COMPANY
Incorporated
501 Grant Building Pittsburgh, Pa.

PIPE—MACHINERY—GAS ENGINES
AIR COMPRESSORS—DIESELS—PUMPS

Some Steam Engines and Boilers available only slightly above the metal price

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WAYNE, WOOD COUNTY, OHIO Near Toledo

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Lathes, Shapers, Milling Machines, Saws etc. for general maintenance work. We have a knowledge of the shop problems of the mine shop. Write or wire us your inquiries.

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NEW and REBUILT
STORAGE BATTERY

LOCOMOTIVES

1½ to 10 Ton — 18" to 56" Track Gauge

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Greensburg, Penna.

CONSTRUCTION & CONTRACTOR'S EQUIPMENT

8 ALLIS CHALMERS SPEED-ACE TRACTOR WAGONS
RD 6 Cat. Diesel Tractor with H.D. Double drum unit & LeTourneau Angledozer
RD 6 Cat. Diesel Tractor with wide gauge, lighting system
D 6 Caterpillar Diesel Tractor
RD 7 Caterpillar Diesel Tractor with double drum hoist
RD 7 Caterpillar Diesel Tractor with ATHEY Bulldozer
Model 50 Caterpillar Diesel Tractor with LaPlant Choate Bulldozer
Model 60 Caterpillar Gas Tractor with LeTourneau Bulldozer
FE 80 Cletrac Diesel Tractor
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Model "J-12" LeTourneau Scrapers
Model "JR-8" LeTourneau Scraper
48" Caterpillar Elevating Grader
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"Anything containing IRON or STEEL"

A DEPENDABLE SOURCE for HEAVY EQUIPMENT

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DRAGLINES — LOCOMOTIVES
SHOVELS—TRACTORS—ETC.

WE WELCOME YOUR INQUIRIES

WE WILL FIGURE WITH YOU ON YOUR SURPLUS

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Girard Trust Bldg. Phila, Pa.

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120 HP Muncie 125 V. D.C.
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32 KW Buda 125 V. D.C.
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185 KW DeLavergne 3/60/220 V.

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3 Howe & Fairbanks 100, 125 & 140 Ton Cap.

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20,000 Gal. Cap. on 80 Ft. Tower
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Cutting Machines

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1—Sullivan Longwall Type. Serial Number 11086.

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1 Counterbalanced Bumper Car Stop, 36" ga. with rear resilient unit or safety horns, complete with connecting levers.
1 Dumping Shield for Rotary Dump, with supporting steel structure for same.
2 Vulcan bottom Discharge Skips, having a capacity of 260 cubic feet, with a hopper 5'10½" x 7'0" inside skips to be complete with safety chains, safety dogs or catches, rope cone, and rope clamp for 1⅝" rope.
1 Platform cage, 6'0¼" between guides, 10'8" long, to be complete with car locking device.
2 Sets curved dump guides on tracks.

All the above unused

PITTSTON-DURYEA COAL CO.
DIME BANK BLDG. PITTSTON, PENNA.

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30 wood mine cars: Gauge 36", Capacity 2 tons, Inside Length 7' 9", Depth 27", Width 60", Height above rails 39", Wheels 16", Alemite fittings, Swivel Couplings. All bumpers, draw bars and door latches good. 3" channels around top of most cars. Also 30 extra swivel couplings 1¼" steel. These cars in first class condition and ready for service.

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1—Ottumwa double drum, single gear reduction Electric Shaft Hoist, complete, in first-class condition, with 60 horsepower, 600 revolution, 220 volt, 3 phase, 60 cycle, General Electric motor.

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BARGAINS IN MOTORS AND MINING MACHINES!

40HP Allis Chalmers Sq. Cage 860 RPM
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15HP Westinghouse Slipring 900 RPM
15HP Otis Slipring 900 RPM
22HP Gen'l Electric Slipring 675 RPM Type ITC
35HP Westinghouse Slipring 580 RPM Type CI
37HP Gen'l Electric Slipring 540 RPM Type ITC
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All motors 3 phase, 60 cycle and can be furnished for either 220 or 440 volts.

1—CE7 DC Sullivan shortwall Mining machine
2—CE7 AC Sullivan shortwall Mining machine
5—CH8 AC Sullivan longwall Mining machine
1—complete motor for CE7 AC Sullivan machine
1—complete motor for Goodman 250 volt DC Std

Several thousand dollars worth of new and used mining machine repair parts. All motors and mining machines have been completely overhauled—we are cleaning up and offering real bargains and, if interested, contact us at once.

ACT QUICKLY——WRITE OR WIRE

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Tunnel Equipment all on 36" Track Gauge
1—Cleveland Jumbo Mounting
2—Ingersoll-Rand DA-35 Drifters
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14—Koppel Side Dump Cars, 70 Cu. Ft.
2—Jump over Switches, 40# Rail
Rennye and Two Drum Ingersoll-Rand Hoists, Scrapers, Pumps, Compressors, etc.

SALMON & COWIN, INC.
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FOR SALE

50 Cars 42" gauge Capacity 3000# excellent Condition 32" high.

MASON & SONS COAL CO.
918 Cross St., Dover, Ohio

LEGAL NOTICE

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912, AND MARCH 3, 1933

Of Coal Age, published monthly at Albany, N. Y., for October 1, 1943.

State of New York)
County of New York) ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared J. A. Gerardi, who, having been duly sworn according to law, deposes and says that he is the Secretary of the McGraw-Hill Publishing Company, Inc., publishers of Coal Age, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, McGraw-Hill Publishing Company, Inc., 330 West 42nd St., N. Y. C. 18, Editor, (Acting) Ivan A. Given, 330 West 42nd St., N. Y. C. 18, Managing Editor, None. Business Manager, Alfred M. Staehle, 330 West 42nd St., N. Y. C. 18.

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5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is. (This information is required from daily publications only.)

J. A. GERARDI, Secretary.
McGRAW-HILL PUBLISHING COMPANY, INC.

Sworn to and subscribed before me this 29th day of September, 1943

[SEAL] EMILY Z. SHEPARD.

Notary Public, New York County, New York Clerk's No. 768, N. Y. Co. Reg. No. 4S1275.

(My commission expires March 30, 1944)

New "SEARCHLIGHT" Advertisements

received by November 30th will appear in December issue, subject to space limitations.

Departmemtal Staff
COAL AGE
330 West 42nd St., New York 18, N. Y.

Prompt Shipment From Our Warehouse

MINING MACHINES

2—12 G3 Goodman 220/3/60 AC 6' bar.
2—12 AB Goodman 250 v. DC 6' bar.
1—35 B Jeffrey 250 v. 6' bar #11416 with cable.

STORAGE BATTERY LOCOMOTIVES

5—6 Ton G. E. Permissible Type LSBE Class 2C6 Form C 9 with 2 HM 825 Ball Bearing Motors 1¼" armorplate frame 44" Ga. (Can change to 36" Ga. or less) 1—Locomotive equipped with Gould Lead Battery 12 months of original guarantee. 3 Locomotive equipped with Edison Batteries with as much as 72 months in original guarantee. Length 13½' long, 50" high, 69" wide and 44" Wheel Base. (Can furnish 150 KW G.E. Syn. M.G. Set. 2200 v. 3 ph. 60 cy. 1200 RPM to charge above batteries.)
3—5 Ton Type D Ironton, 36 or 44" Ga.
1—4 Ton Jeffrey 44" Ga. with Battery.

(Haulage)

10 Ton Westgh. 250 V. 36" or 40" Ga.
8 Ton Westgh. 250 V. 42" Ga.
2—5 Ton West. 250 V. 36 or 42" Ga./with Electric Gathering Reels. Bar steel frame.

SCREENS

2—4' x 5' single deck Tyler Hummer Screens Type 3T equipped with V-16 Vibrators No. 2360 and 2367 designed for 110 v. AC 15 cy.

MG SETS 3 ph. 60 cy. (Syn.)

150 KW Ridgway 250 V. DC 2200 V. AC 900 RPM.
125 KW Cr. Wh. 250 v. DC—2200 v. AC
30 KW West. 250 V. DC—220 V. AC 1150 RPM.
22½ KW Al. Ch. 125 V. DC—2200 V. AC 900 RPM.

ENGINE GENERATOR SETS

100 KW 250 v. DC Westgh—Skinner Engine.
50 KW West. 125 v. DC—Skinner Engine.
25 KW Westinghouse 125 v. Steam Turbine.

SLIP RING & SQ. CG MOTORS
(3 ph. 60 cy.)

HP	Make	Speed	Wdg.	Type
400	West.	500	S.C.	Ca.
200	G.E.	250	S.R.	MT 412
200	G.E.	600	S.R.	I-M
150	Al. Ch.	685	S.R.	
150	G.E.	600	S.R.	IM
125	Al. Ch.	435	S.R.	
100	G.E.	500	S.R.	MI-25 cy.
100	Al. Ch.	575	S.R.	

AIR COMPRESSORS

Sullivan Portable Mine Compressor 10" x 10" with 40 HP Motor, 42" Ga.
492 cu. ft. 100#C hg. Pneumatic straight line heavy duty Diesel oil driven Compressor unit.

HOISTS

75 HP Lidgerwood sgl. fr. drum
50 HP Diamond 2 drums same Shaft
52 HP American 2 drum, AC Motor
30 HP Clyde sgl. drum AC Motor
30 HP Double drum—Tandem
15 HP Lidgerwood sgl. dr. AC Motor

400 TRANSFORMERS
(Westgh. & GE 1 ph.)

Qu.	KVA	Pri. V.	Sec. V.
3	1	2080/2200	115/230
5	2	"	"
100	5	"	"
82	7½	"	"
71	10	"	"
2	25	2200	244/488
1	30	2080/2200	115/230
3	37 Rotary	4400/185	"
3	37½	2200	220/440
3	50	22000	2200
3	75	2200	110/220
3	100 Uptegraff	400	220

D. C. MOTORS

125 HP General Electric 230 V. 750 RPM.

MOORHEAD-REITMEYER CO., INC.

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3—One POMONA Vertical Pump, 75 h.p., AC, 250 v. 60 cy. 3 ph. Westinghouse motor, together with starting compensator, capacity 1000 gal. per min., 200 feet head.

4—One ALLIS CHALMERS Pump, type BS 13406, 100 h.p., motor AC, 220 v. 60 cy., 3 ph., capacity 1000 gal. per min., 250 feet head.

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AC & DC

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1—35B Jeffrey 500 volt Shortwall
1—212AA Goodman Low-vein 500 volt Shortwall
1—29LE Jeffrey T.O.H. Arcwall Permissible
1—12DA Goodman, 50 HP, 210 volt
1—12A Goodman, 500 volt Shortwall
1—12G3 Goodman AC Shortwall, 3/60/220-440 volt

LOCOMOTIVES

1—13 ton G.E. with HM-829 250 V Motors
1—10 ton G.E. with HM-830 250 V Motors
1— 8 ton G.E. with HM-839 250 V Motors, and reel
2— 6 ton Jeffrey with MH-88 250 V Motors, and reels
1— 6 ton G.E. with HM-819 250 V Motors

ELECTRIC MOTORS, ETC.

1—165 HP G.E. Syn. Motor, 3/60/2200 or 500 V, 900 RPM
1—100 HP Crocker Wheeler Syn. Motor, 3/60/220 V, 1200 RPM
2—50 HP G.E. Slip Ring Motors, 3/60/440 V, 600 RPM
1—100 HP West. Type CW Slip Ring Hoist Motor, 3/60/2200 V. 720 RPM
3—150 KVA Pittsburgh Transformers, 6800-220/440 V
3—100 KVA G.E. Transformers, 13,200/6800/2200-220/440 V
3—30 KVA West. 2200-110/220 V
1—25 HP West. Type HK, 250 V. Series Wound Hoist Motor, 600 RPM

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3530 Forbes St. Pittsburgh, Penna.

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All items at various points

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Natl. Stock Yds., St. Clair Co., Ill.

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1—Harrisburg Standard 15x8 Steam Engine Direct Connected to a 100 KW 220-250 DC Bullock Generator.
1—125 Horse Power Houston Standwood & Gamble Steam Boiler.
1—Large boiler steel water tank. Boiler feed pump, Jet, Switchboard & other items to make power plant complete.

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Scale, Vibrating Screen and Crusher Mfrs.

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PITTSBURGH NEW YORK CHICAGO

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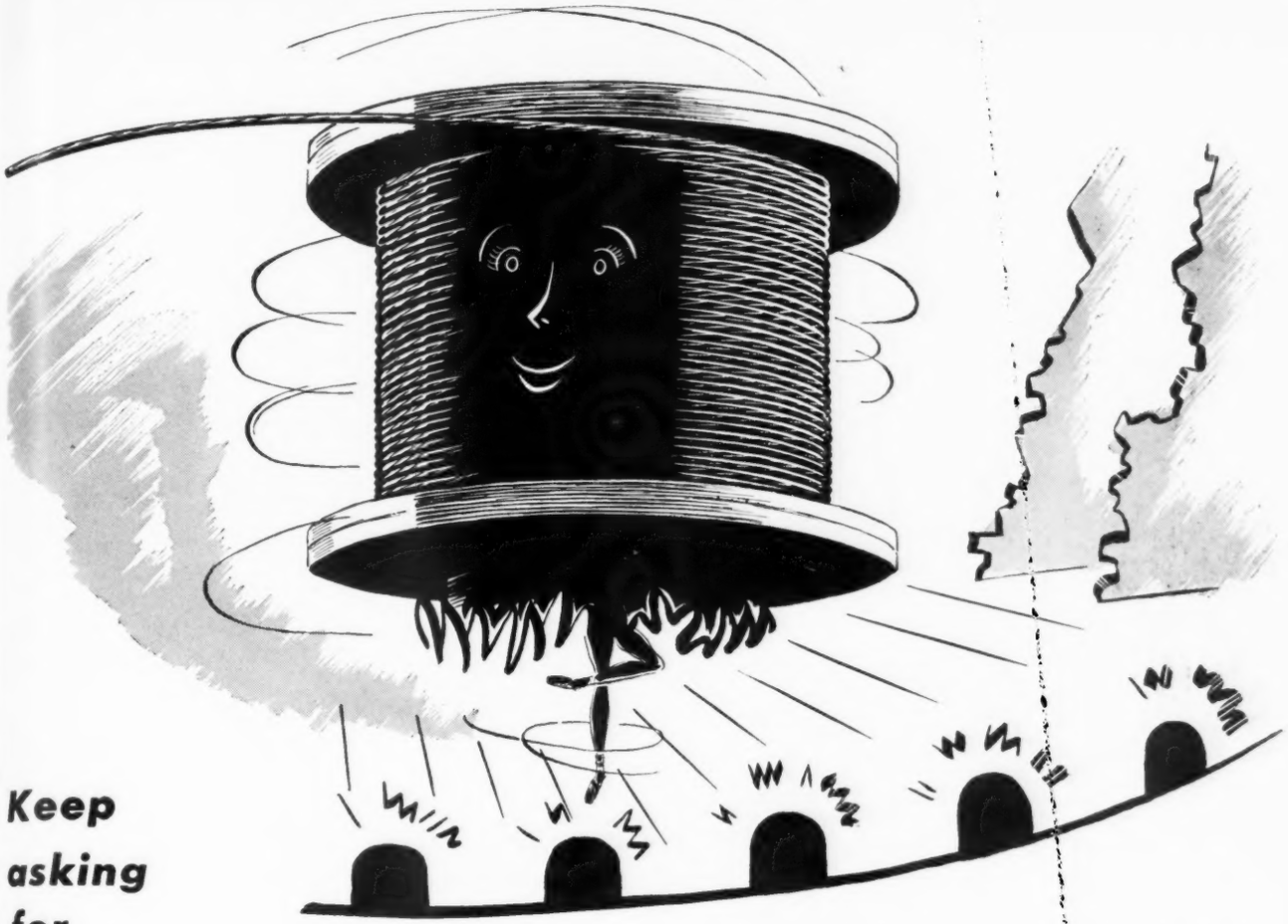

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